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June 1958

**CHEMICAL AND PETROLEUM ENGINEERING EXHIBITION PREVIEW**

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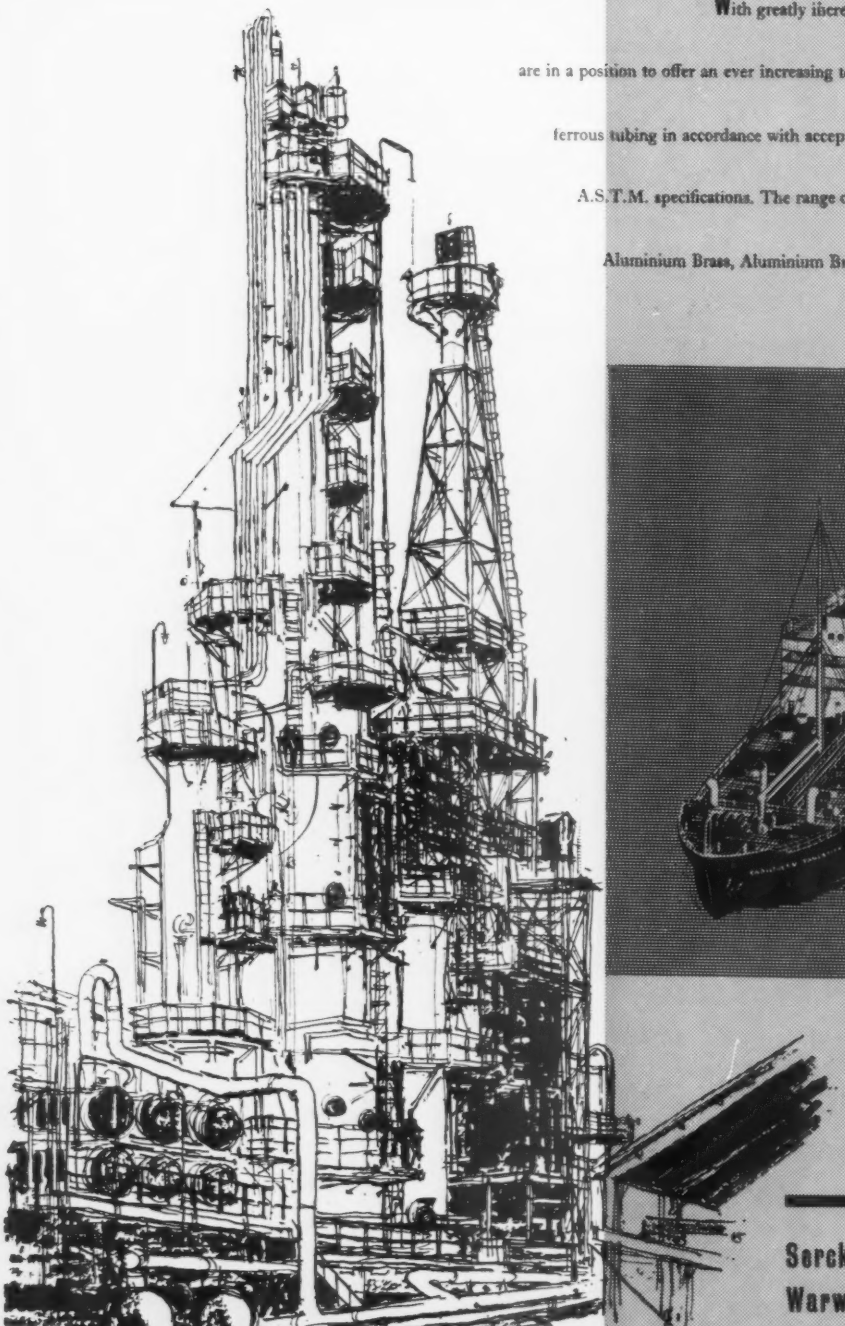

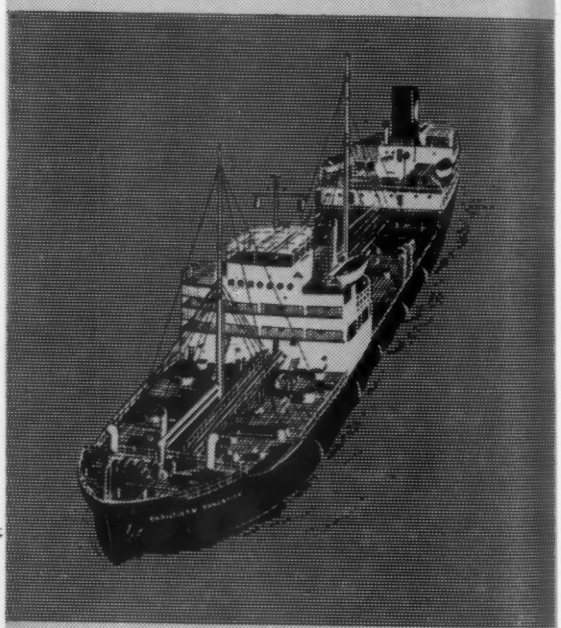

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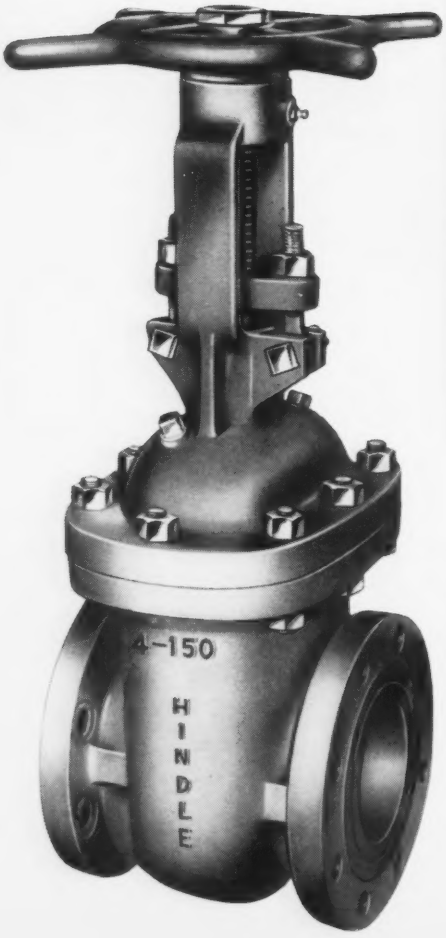


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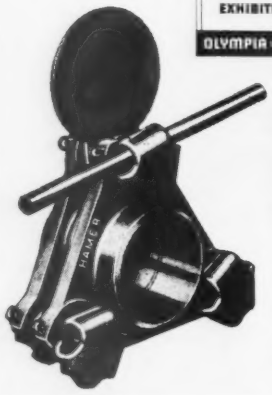


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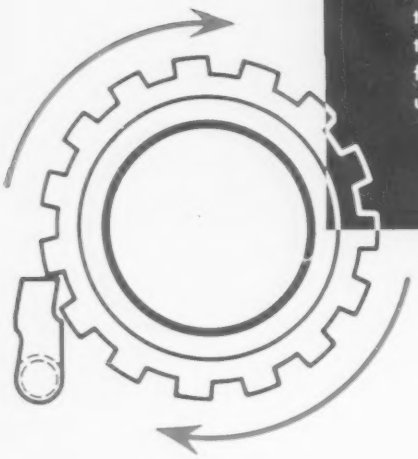

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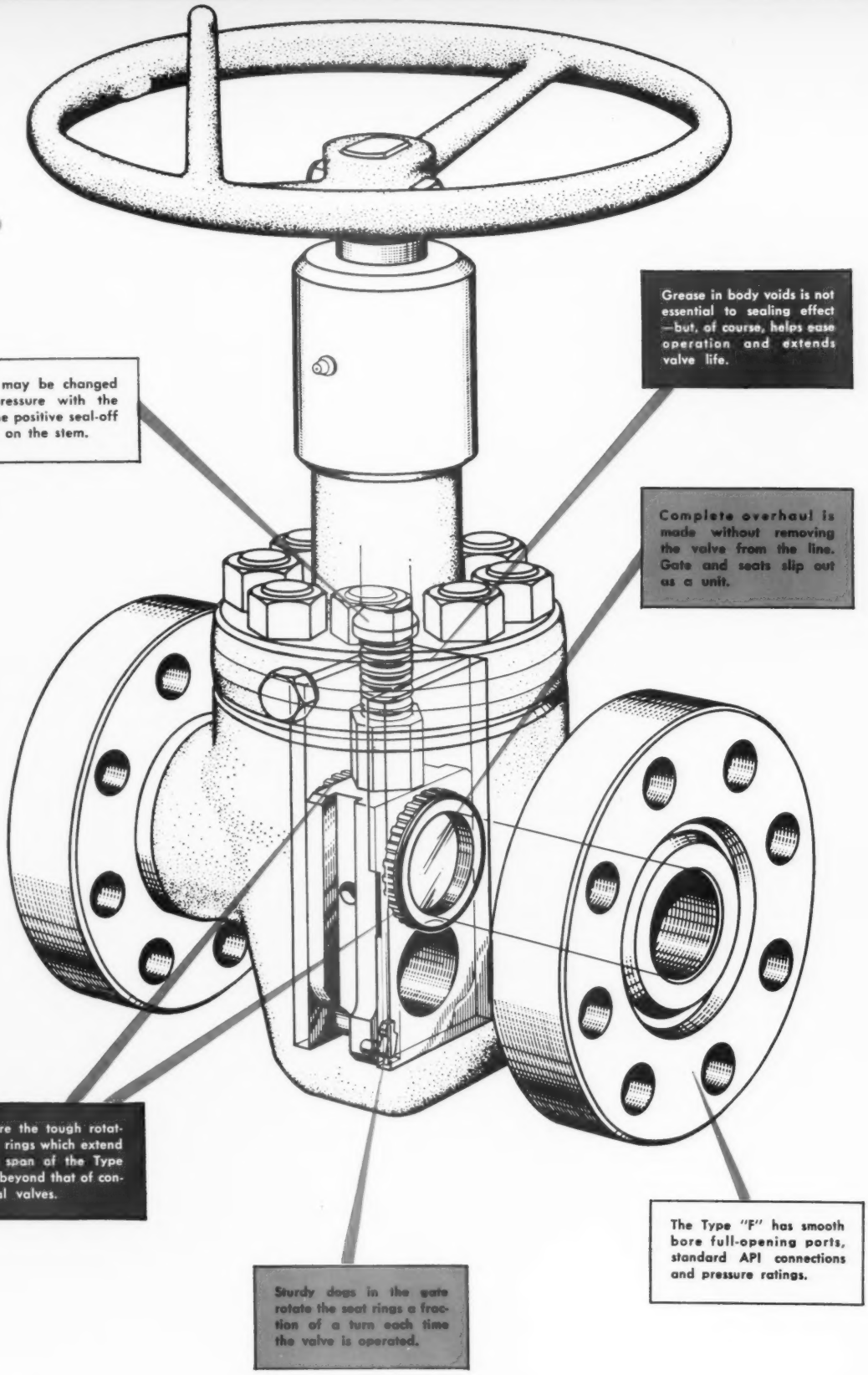
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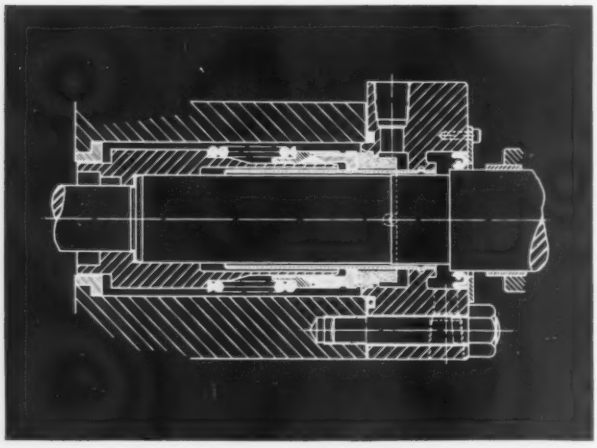

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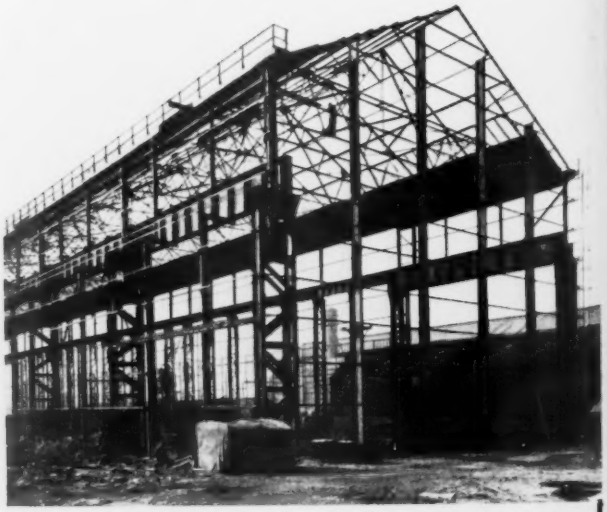

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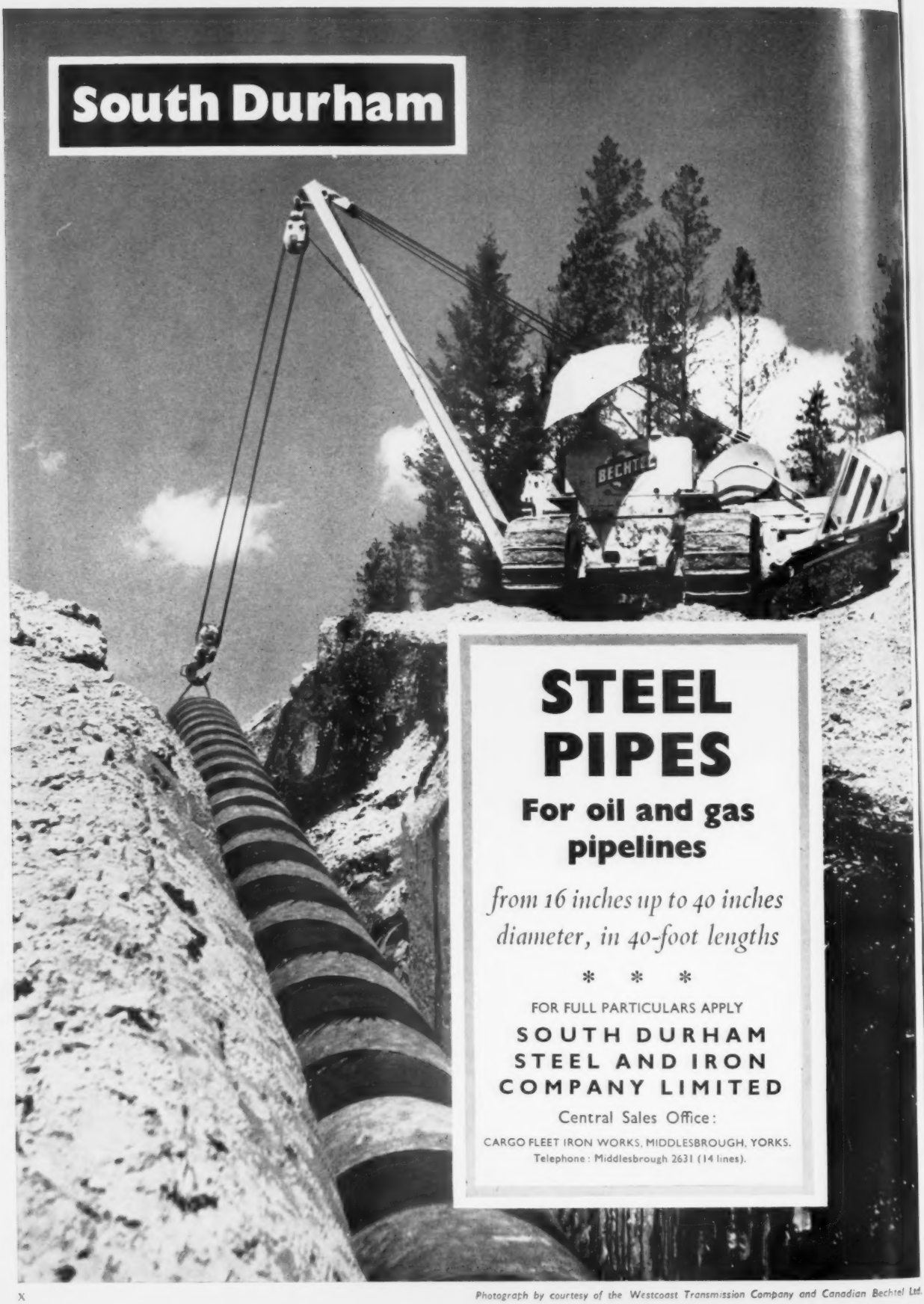
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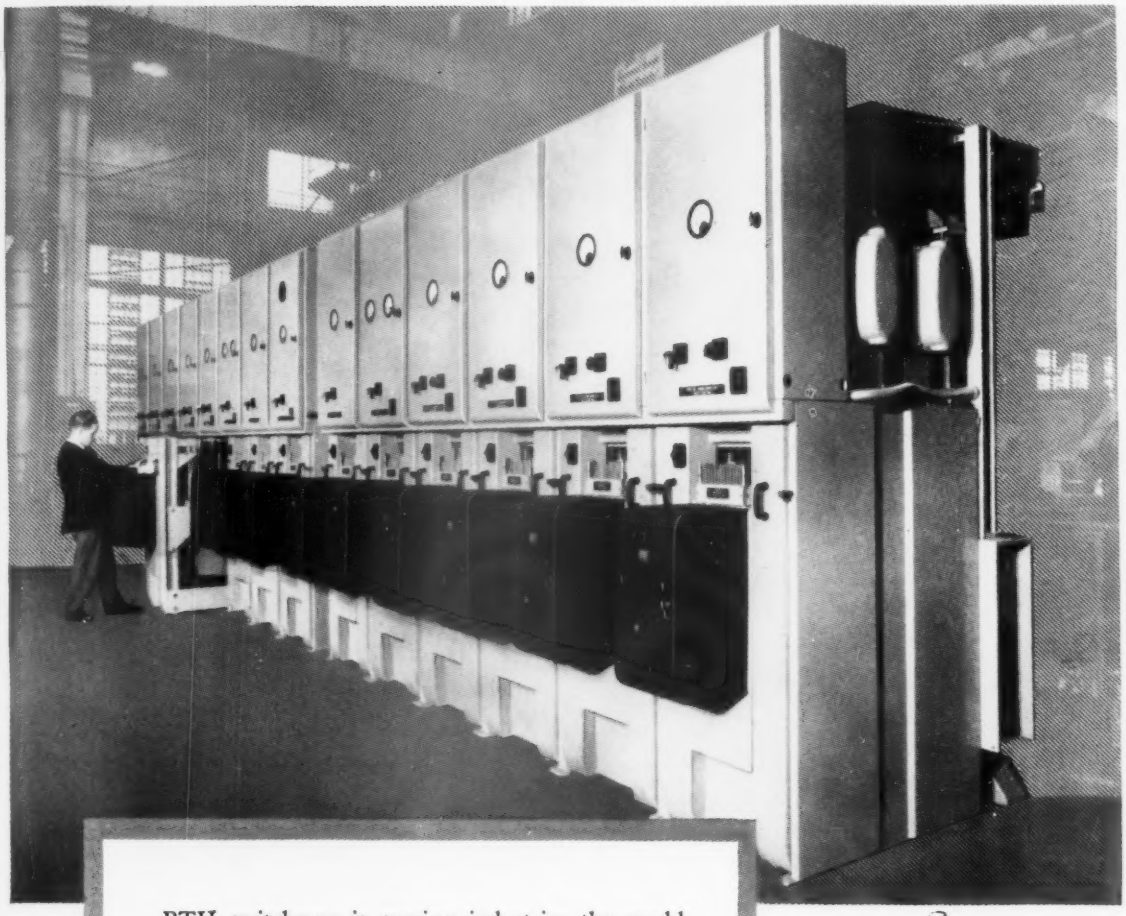
*Fourteen-panel, 11-kv, 500-MVA, Class QF10 switchboard for Kuwait Refinery*



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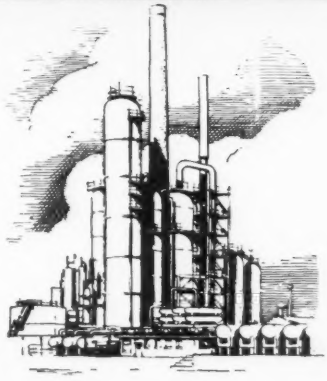

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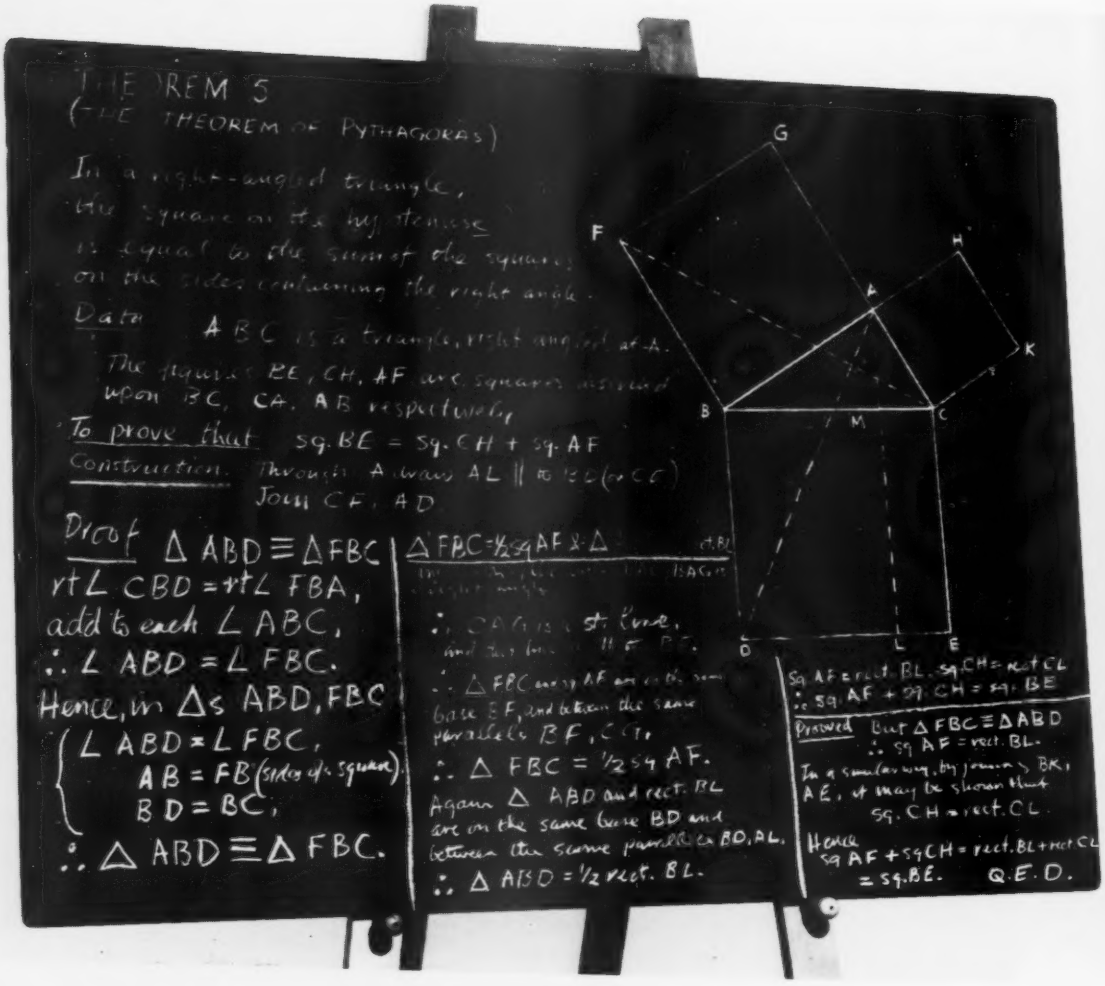
THEOREM 5
(THE THEOREM OF PYTHAGORAS)
In a right-angled triangle, the square on the hypotenuse is equal to the sum of the squares on the sides containing the right angle.
Data ABC is a triangle, right angled at A.
The figures BE, CH, AF are squares described upon BC, CA, AB respectively.
To prove that sq. BE = sq. CH + sq. AF
Construction. Through A draw AL ∥ to BD (or CE)
Join CF, AD
Proof △ ABD ≡ △ FBC
rt∠ CBD = rt∠ FBA,
add to each ∠ ABC,
∴ ∠ ABD = ∠ FBC.
Hence, in △s ABD, FBC
∠ ABD = ∠ FBC,
AB = FB (sides of sq.)
BD = BC,
∴ △ ABD ≡ △ FBC.
△ FBC = ½ sq AF
∴ CA is a st. line,
∴ △ FBC and AF are on the same base EF, and between the same
∴ △ FBC = ½ sq AF.
Again △ ABD and rect. BL are on the same base BD and
∴ △ ABD = ½ rect. BL.
sq AF = rect. BL, sq CH = rect CL
∴ sq AF + sq CH = sq BE
Proved
But △ FBC ≡ △ ABD
∴ sq AF = rect. BL.
In a similar way, by joining BK,
AE, it may be shown that
sq. CH = rect. CL.
Hence
sq AF + sq CH = rect. BL + rect CL
= sq. BE. Q.E.D.
G
F
H
A
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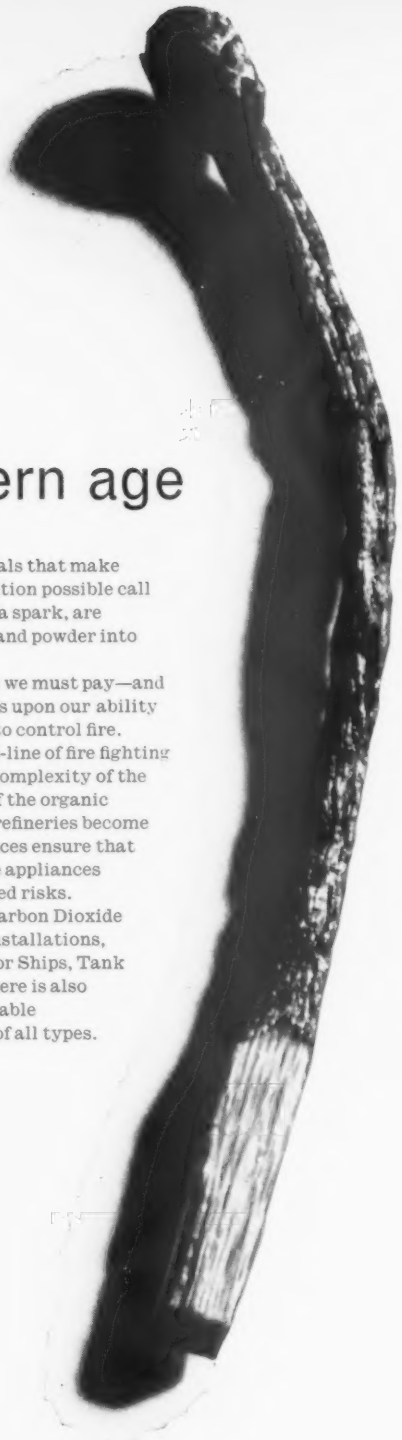

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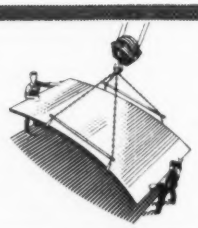

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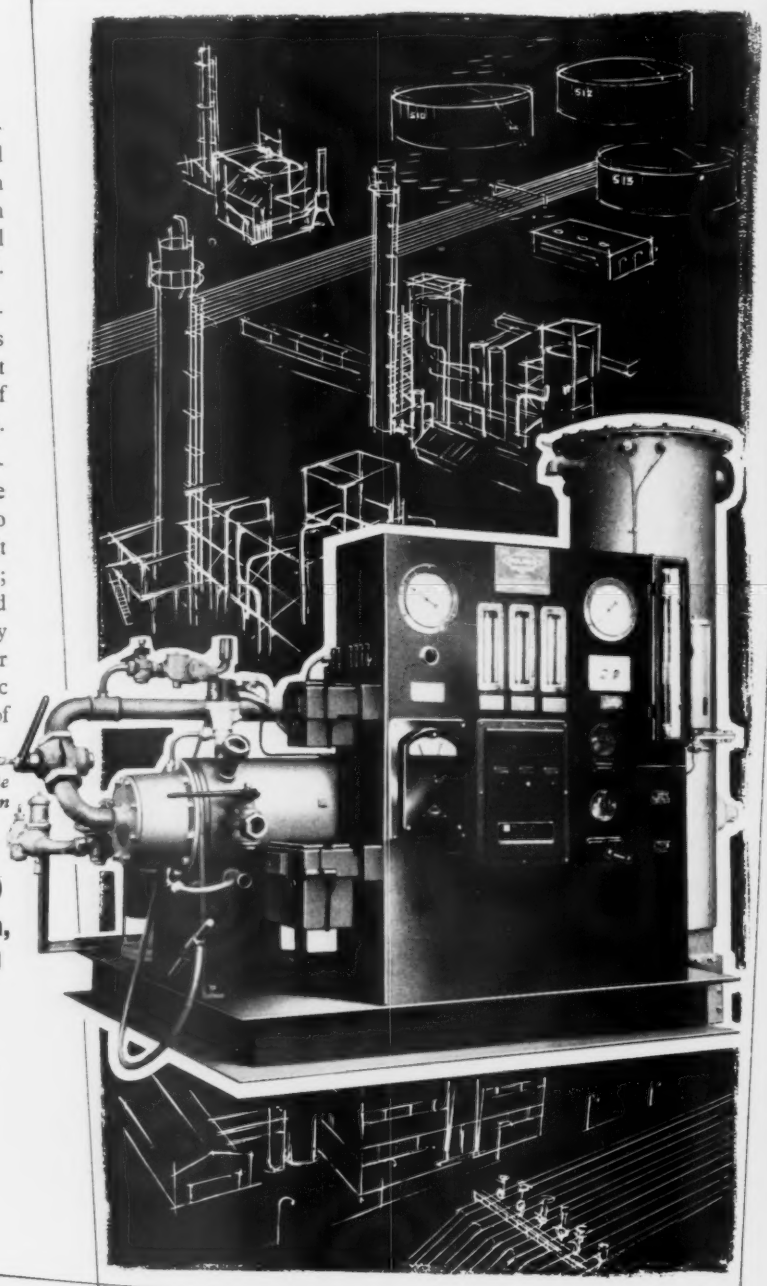


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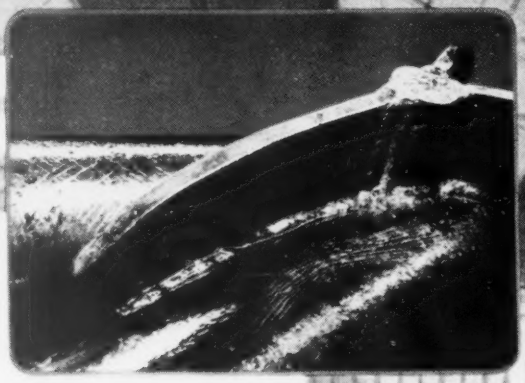
# SCIENCE AND THE STEEL TUBE AGE: 6



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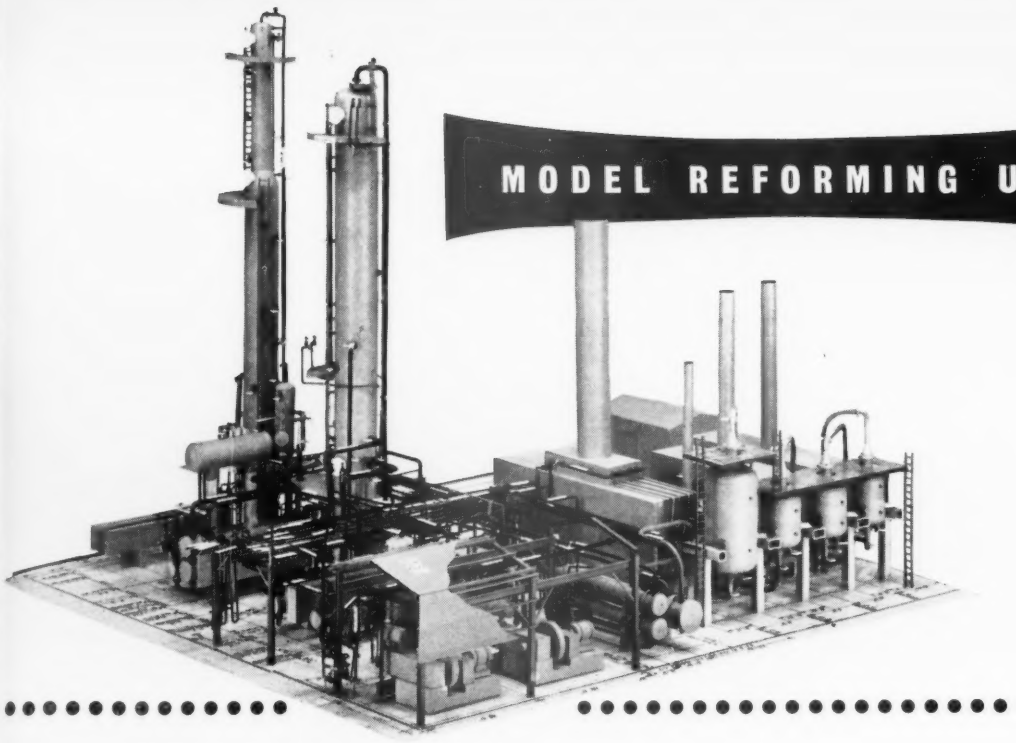


This scale model of a Kellogg catalytic reforming unit designed for Sinclair-Baker catalyst illustrates the detailed thoroughness of Kellogg services. The Kellogg organisation has developed a wealth of experience in engineering and constructing a large number of reforming units of different capacities using as many as seven different catalytic reforming process designs. The most recent Kellogg design for the highest octane reformates utilizes the Sinclair-Baker catalyst.

The Kellogg organisation can deliver the precise catalytic reforming unit required for any specific individual refinery situation. The most recent example of this service was to design a unit which can operate on either of two different catalysts depending on the reformate octane requirements. Refiners are invited to discuss with the Kellogg International Corporation the various applications of catalytic reforming process designs and the engineering changes necessary to modify their existing reforming units to accommodate an alternate catalyst required for higher octane reformates.

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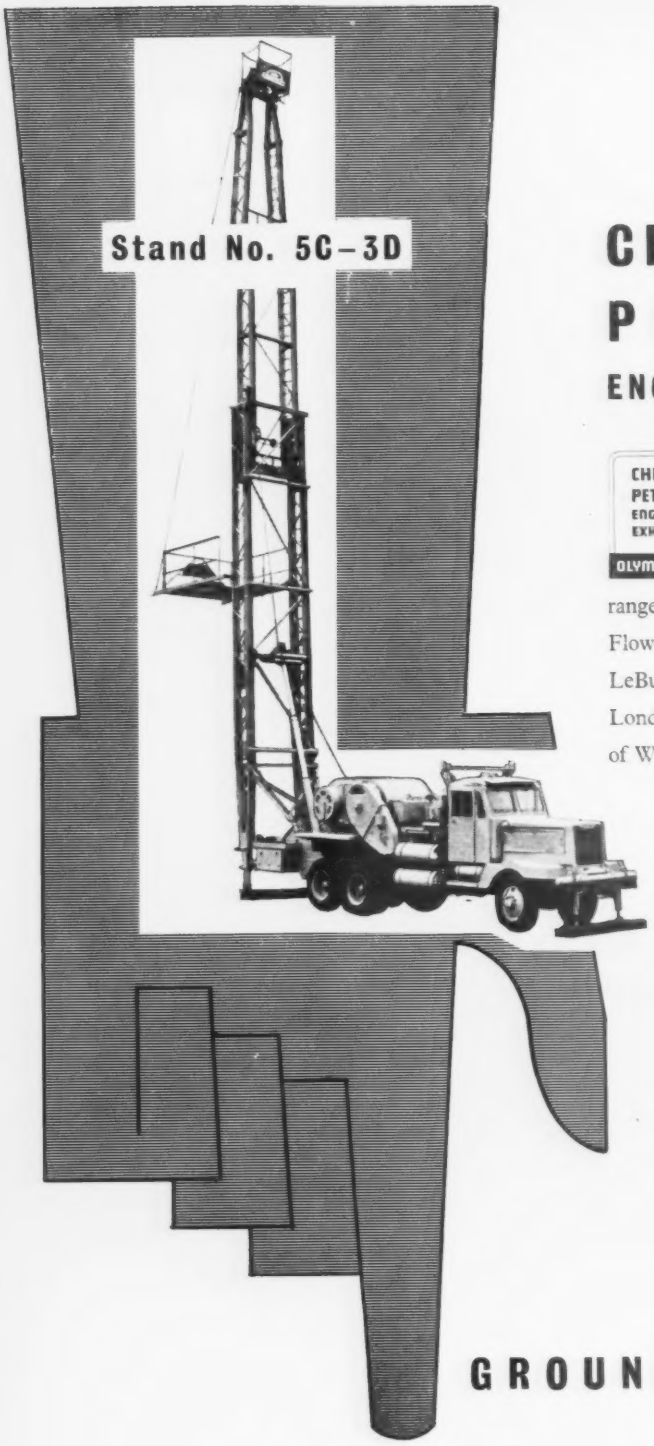
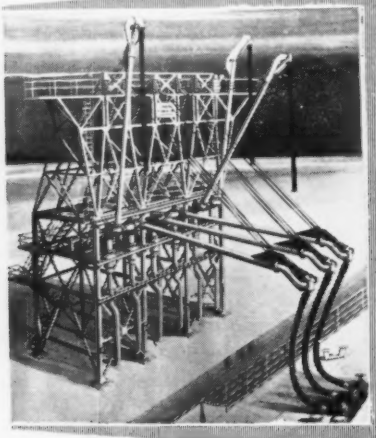



# CHEMICAL AND PETROLEUM

## ENGINEERING EXHIBITION

CHEMICAL & PETROLEUM ENGINEERING EXHIBITION
OLYMPIA LONDON 18-28 JUNE 1958

The comparatively new Woodfield W.V.5 chassis equipped with an Ideco-Woodfield H-20 drilling and servicing hoist and Kwik-Lift Mast, as illustrated, is typical of the range of IDECO equipment built under licence in the United Kingdom. Flow Boom Equipment for loading and unloading of tankers, and the LeBus Counterbalanced Wire Line Spooling System are on show in London for the first time, together with a representative display of Woodfield's activities.



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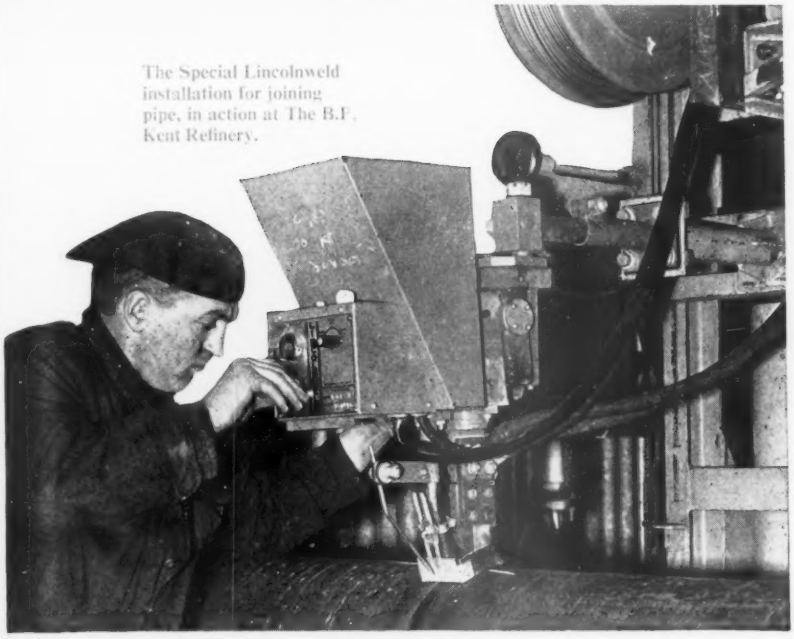

The Special Lincolnweld installation for joining pipe, in action at The B.P., Kent Refinery.

**CHEMICAL AND PETROLEUM ENGINEERING EXHIBITION**
**18th-28th June, 1958**

**See the full range of Lincoln Electric Welding Equipment at Stand No. 2A (Ground Floor) Grand Hall, Olympia.**

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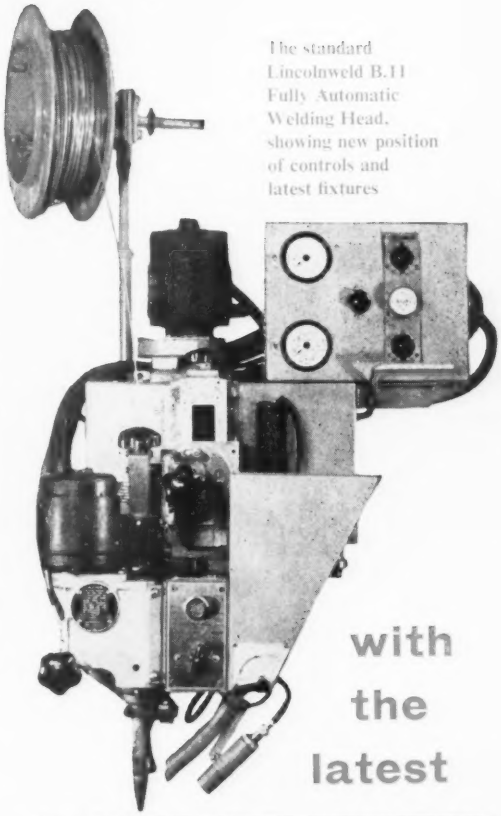

The standard Lincolnweld B.11 Fully Automatic Welding Head, showing new position of controls and latest fixtures

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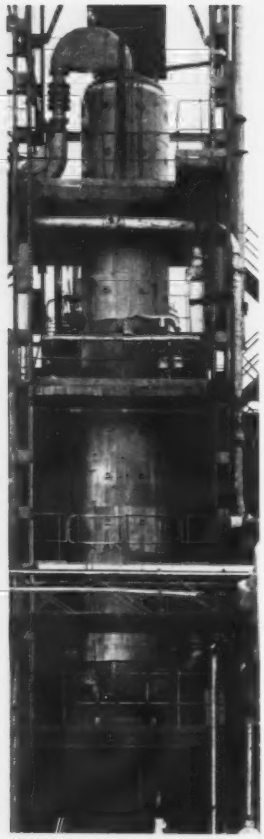

## to the

**CHEMICAL & PETROLEUM ENGINEERING EXHIBITION**

**Olympia, London**
**18th-28th JUNE 1958**

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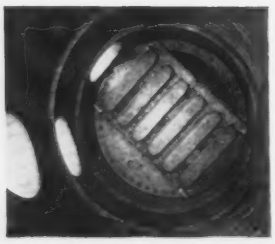

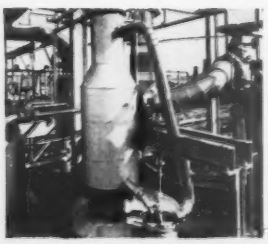

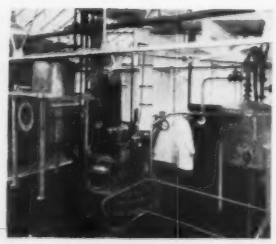

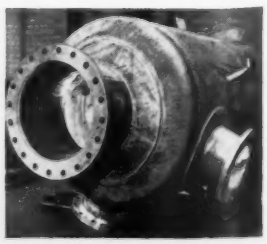

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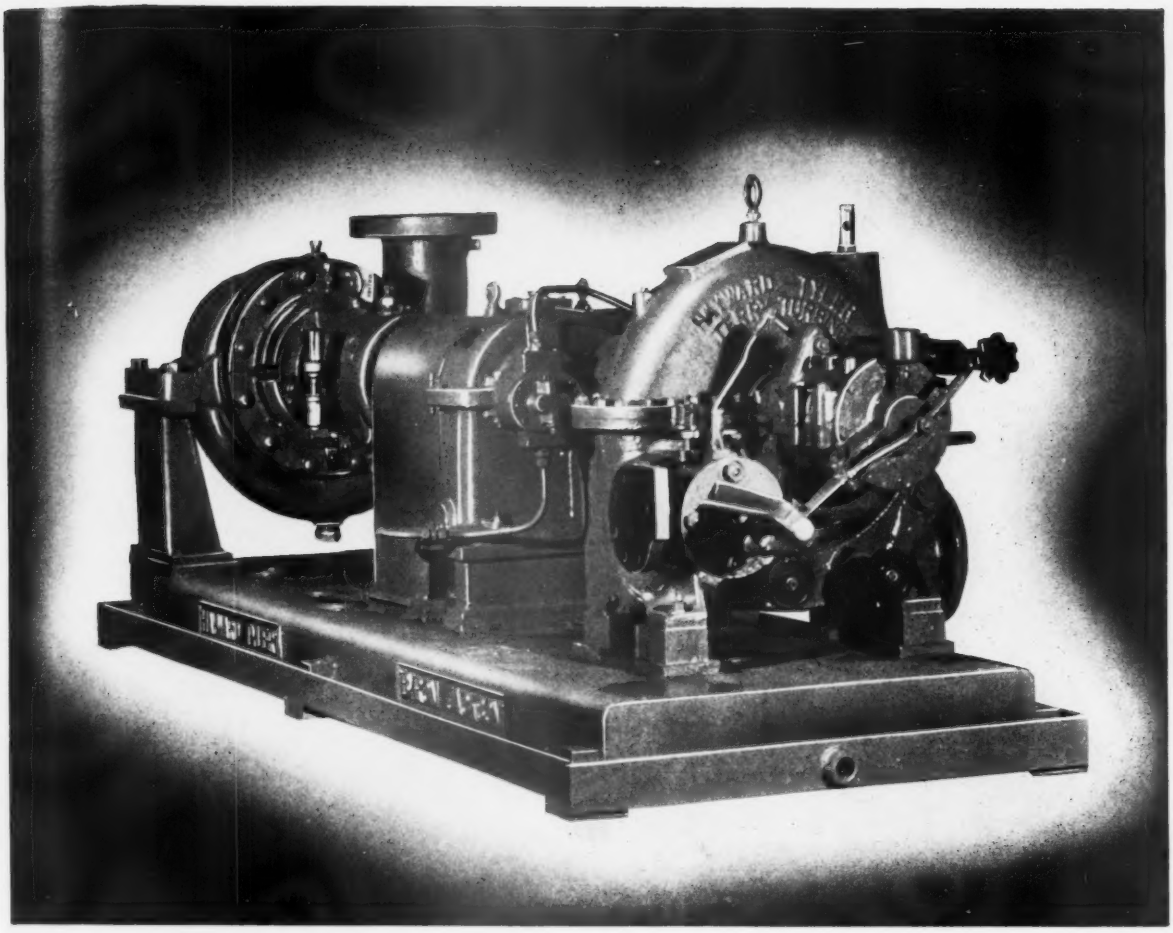

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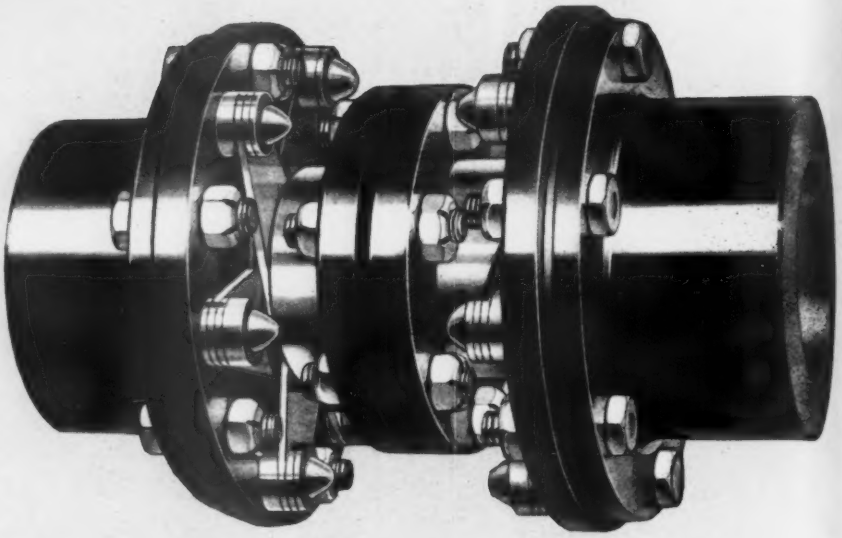

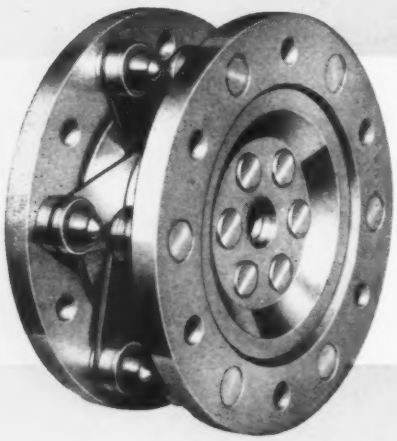

## THE DYNALINK REMOVABLE TRANSMISSION UNIT

The transmission unit shown in this illustration is the heart of the coupling and can readily be removed without disturbing either the driving or driven machine. The illustration shows the complete transmission unit of the DYNALINK coupling in its simplest form, i.e. Type R.

For further information see Publication Number D.25/9 (1957)

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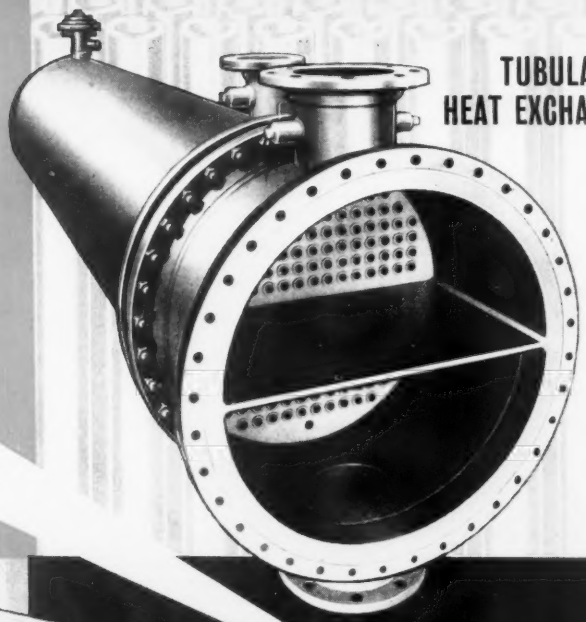

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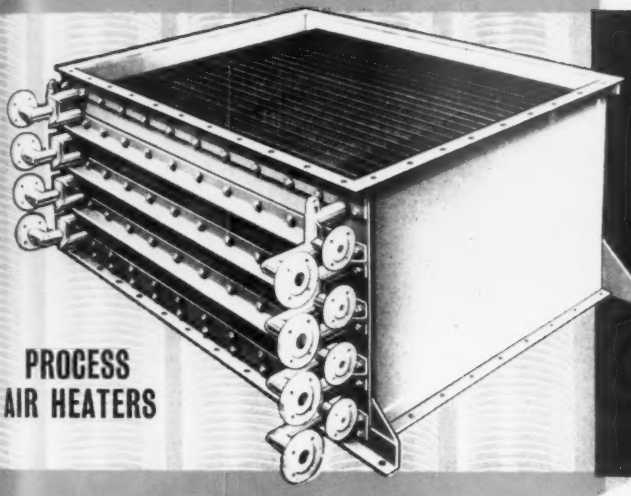

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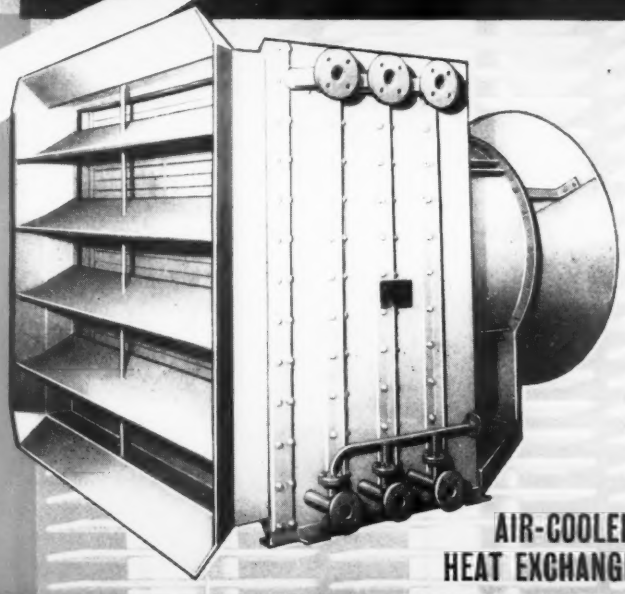

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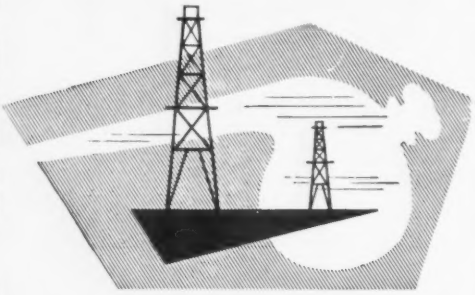
# CHEMICAL AND PETROLEUM ENGINEERING EXHIBITION



An outstanding development in British industry in the last twenty years has been the expansion of the Petroleum refining and Chemical Industries. The Chemical and Petroleum Engineering Exhibition—the first of its kind—will present dramatic evidence of the tremendous achievements that have been made.

At Stand after Stand, contractors, designers and specialists in every branch of British chemical and petroleum engineering will have something to show of vital interest.

The Exhibition will also include a conference on "The Organisation of Chemical Engineering Projects" arranged by The Institution of Chemical Engineers and The Institute of Petroleum; and films will show how the Chemical Plant and Petroleum Equipment Industries have helped in the development of their consumer industries.

A visit to this Exhibition is a MUST to all concerned in chemical and petroleum projects and to everyone whose industry is in any way influenced by such projects.

**JUNE 18-28 1958**
**OLYMPIA**
**LONDON**

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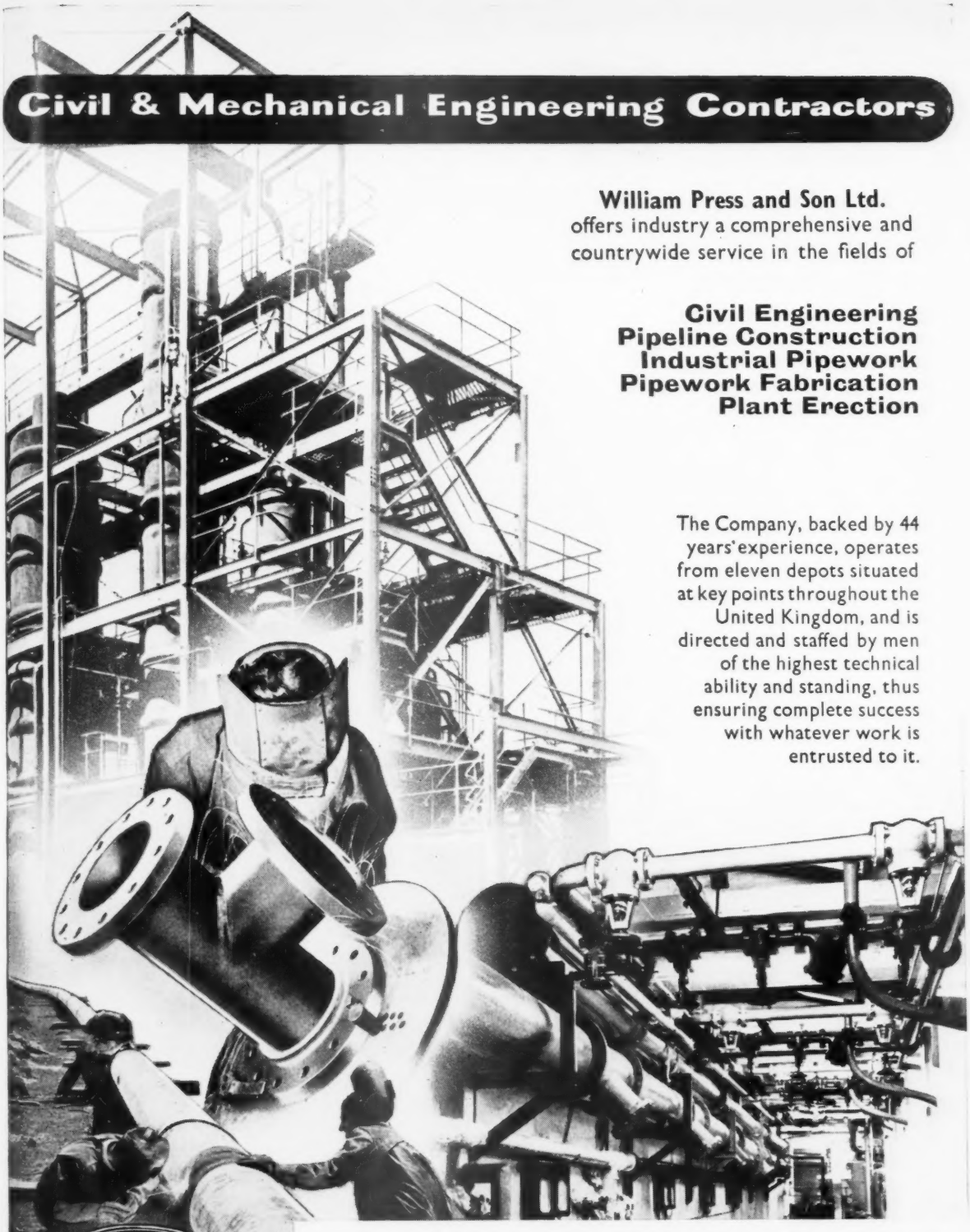

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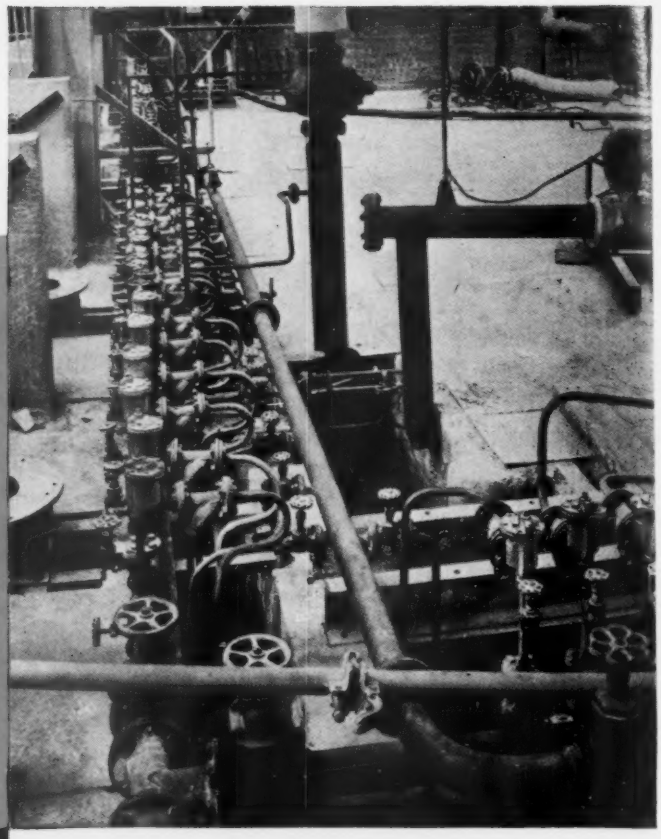

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OLYMPIA — 18-28 JUNE 1958
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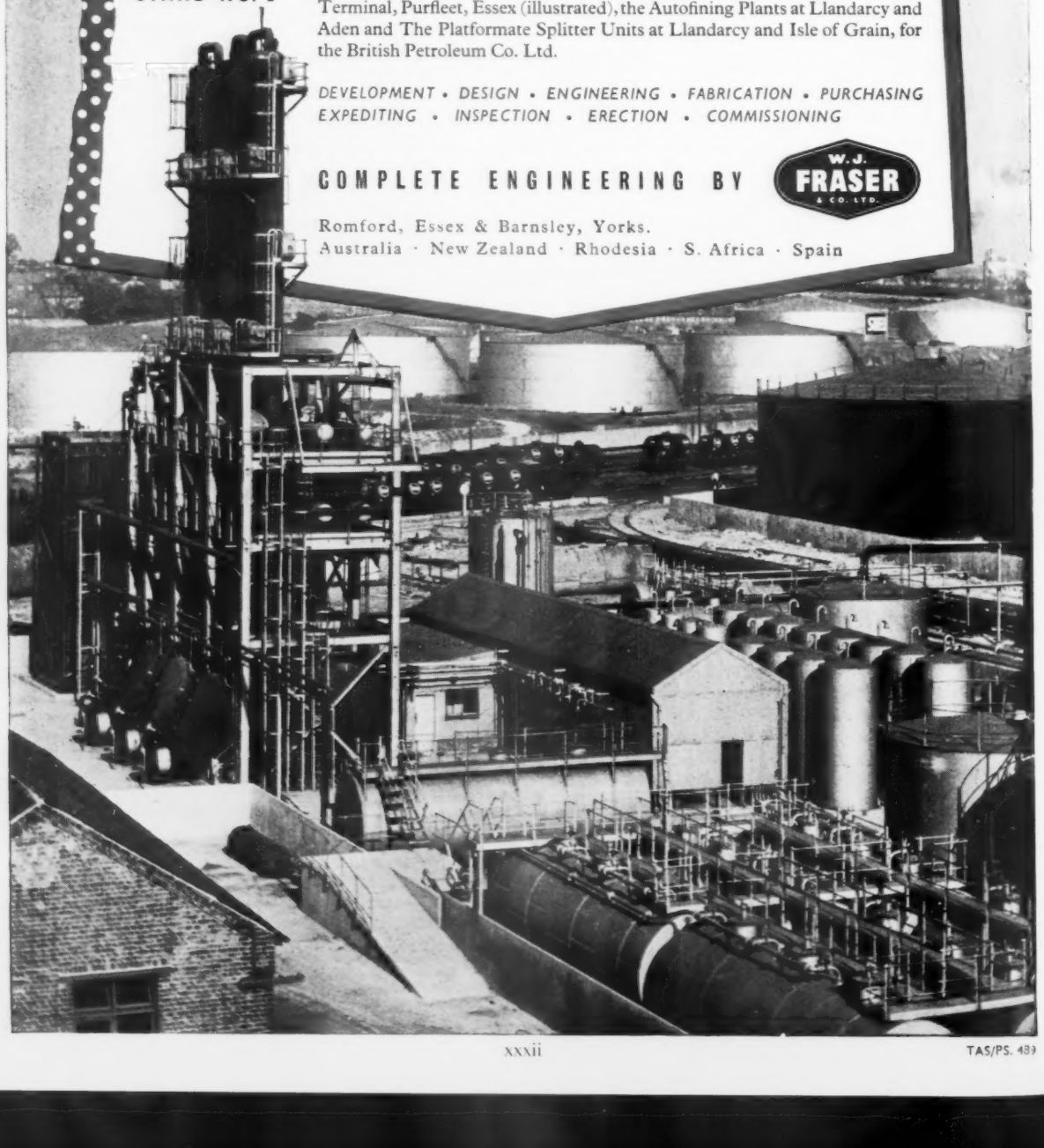





TAS/PS. 489

THE INSTITUTE OF PETROLEUM
REVIEW

Volume 12, No. 138 June 1958

*Honorary Editor:* E. B. EVANS, M.Sc., PH.D., F.R.I.C. *Hon. Associate Editor:* D. L. SAMUEL, B.Sc., A.R.I.C. *Editor:* GEORGE SELL

# *The Chemical and Petroleum Engineering Exhibition*

## *Olympia, London—18-28 June*

In so far as the petroleum industry is concerned this exhibition will be the fifth to be held in Britain in which equipment used specifically by the industry has figured to some degree. The first such exhibition was in September 1912 and the venue was the same as for the present show, that is, the Olympia. However, the 1912 effort, known as the Oilwell Engineering Exhibition, was a very small affair and was part of the Hardware and Ironmongery Exhibition.

It would appear from published accounts that very little oilwell machinery was on show, although the Galizische Karpathen Petroleum A.G. exhibited models of a complete drilling outfit and pumping equipment. The Holland Drilling Company also displayed actual equipment, including a patent dry core rotary drill.

The then British Petroleum Company exhibited samples of petroleum products, including two grades of "Shell" motor spirit, the Anglo-Saxon Petroleum Company a model of a motor tanker, and the Anglo-Maikop Corporation displayed samples of crude oils and products as well as photographs of its Russian oilfields. There was also a collection of oil products and crudes from various parts of the world, including some sent by Sir Boverton Redwood, the co-founder of the Institute of Petroleum.

Several examples of can-making machinery were exhibited and also a number of crude-oil and kerosine engines. Petrol air-gas generators were on at least three stands and it is of interest to note that the Neo Petroleum Syndicate had a process for rendering refined petroleum non-explosive.

### The International Petroleum Exhibition

The next effort and a much larger one than its predecessor was held over a fortnight in the spring of 1914 in the Queens Palace, Earls Court. This time there was more actual machinery on show and this included a 24-hp portable drilling rig for 2000 feet, shown by the Holland Drilling Company. The J. F. Lucey Company had a working exhibit of their Parker Mogul rotary rig in a full-size derrick and Compayne Ltd demonstrated a rotary rig operated by their system of oil transmission. The Oil Well Engineering Company were there as also were Werf Conrad Ltd, John Thom, the Ingersoll-Rand Company, Trauzl & Company, and others then well-known in the industry.

The petroleum companies themselves were well represented and models of tankers as well as samples of oil products were very popular. Thus, the Anglo-American Oil Company (now Esso Petroleum Company) had a model of *Narrangansett*, the Anglo-Mexican Petroleum Products Company one of *San Fraterno*, and the then British Petroleum Company one of *Nerite*. This latter Company also exhibited a collection of the shells after which the Shell tankers had been named.

Oil burning equipment, domestic and industrial, was seen on several stands, can-making plant was again featured, and Bruenn Koenigsfelder Machinefabrik showed a model of a unit for the continuous high vacuum distillation of lubricating oil. A number of oil engines were on view. Trinidad also had a stand arranged by the West India Committee and carrying examples of the island's products.

Both the 1912 and the 1914 exhibitions were organized by G. D. Smith, who proposed to hold a similar exhibition in October 1915.

### The Crystal Palace Exhibition

For reasons beyond the control of any exhibition organizer the 1915 proposal could not be implemented and it was not until 1920 when, on the occasion of the Imperial War Museum and Victory Exhibition at the Crystal Palace, the Canada Building was occupied by a Petroleum Exhibition.

This exhibition was much on the lines of those held previously and was entirely indoors. Thus, only a comparatively small amount of full-size machinery was on show, although the Lucey Manufacturing Corporation had a 20-inch rotary on a complete derrick floor.

The petroleum companies were very well represented and

included the Anglo-American Oil Company, the Anglo-Mexican Petroleum Company, the "Shell" Marketing Company, and the British Motor Spirit Company. An impressive stand was that of the Burmah Oil Company. Designed as a Burmese pagoda and with exhibits of original carvings and moulded wax figures, this stand carried also the products of associated companies—the Anglo-Persian Oil Company, British Petroleum Company, and Scottish Oils.

The stand of English Oilfields Ltd was described at the time as being a scenic reproduction of the Norfolk landscape with exhibits of samples of Norfolk shales and clays and of refined products made from Norfolk crude shale oil.

**The British Empire Exhibition**

Although the petroleum industry as such was only concerned to a small extent in this great exhibition of 1924, there were several exhibits in the grounds in particular which were definitely "oil". They consisted of two full-size drilling rigs one of which, a rotary outfit by Vickers Ltd, was actually making hole. Incidentally, the same rig carried as an exhibit the actual tools which were used to drill the Drake well in 1859. The other rig was a combination rotary-percussion outfit manufactured by the Oil Well Engineering Company.

Naturally, the Palace of Engineering and the Palace of Industry contained much equipment used by the petroleum industry and plant using petroleum products. Various oil companies exhibited their products in appropriate places.

**The Present Exhibition**

The present exhibition, as its name—The Chemical and Petroleum Engineering Exhibition—indicates, is a joint presentation of the equipment used in the chemical and petroleum industries. Most appropriately, the exhibition is sponsored jointly by the Council of British Manufacturers of Petroleum Equipment (CBMPE) and the British Chemical Plant Manufacturers Association (BCPMA). Among its over 300 exhibitors will be found names which are household words in the petroleum equipment industries and it can safely be said that every type of equipment used in the petroleum industry will be represented.

While much of the plant on show—pumps, pressure vessels, reaction columns, and a multitude of others—will be of common interest to both industries, there will be a lot of things which are used only or mainly by the petroleum industry.

The importance of the petroleum industry, itself a comparative youngster, to Britain's other industries is best illustrated by reference to the magnitude of the purchases made in Britain by the oil companies. For the five-year period 1953–57 the details are:—

| *Type of equipment* | | *Value million £* |
|---|---|---|
| Tubular goods, pipe fittings, valves, pumps (excluding oil-well and kerbside) | | 103·0 |
| Bulk chemicals, catalysts, barytes, etc. | | 99·9 |
| Specialized oil equipment: | | |
| For drilling and production, including casing and tubing | 60·6 | |
| For oil refineries, excluding pumps and valves | 20·6 | 81·2 |
| Machine and hand tools, machinery stores, plates, sections, bars | | 65·8 |
| Drums, drumsheets, drum and can-making plant, filling equipment, metering and dispensing equipment | | 39·5 |
| Electric motors, generators, transformers, etc. | | 31·3 |
| Commissary, office supplies, household goods, sports equipment | | 30·3 |
| Automotive equipment, all types | | 30·2 |
| Tankage and fittings, railcars, road tankers, etc. | | 26·4 |
| Cement, building materials, hardware, timber | | 22·5 |
| Boilers, boiler house plant, prime movers, compressors | | 17·1 |
| Instruments, gauges, laboratory equipment, medical supplies | | 11·3 |
| Geophysical and exploratory equipment | | 0·3 |
| | | £558·8 |

The exhibition, which is open from 18 to 28 June, will occupy the ground floors and galleries of the Grand and National Halls at the Olympia. Details of the exhibits, as far as they are available at the time of going to press, are given below in alphabetical order of exhibitors.

## *Alphabetical List of Exhibitors*

Stand details indicate position in the Grand or National Halls. Thus, the notation 5 G denotes Stand No. 5 in row G on the ground floor.

**ACCLES & POLLOCK Ltd, Birmingham** — **Stand 7 inner, National gallery**

**ADAMSON, DANIEL, & Co. Ltd, Dukinfield, Cheshire** — **Stand 2 H, Grand**

Prominent on this stand are heat exchangers of various types. Examples shown include the shell and tube type, a part-sectioned Alcotwin extended surface tubular type, and air-cooled models.

The Company manufactures also dished and flanged pressings in ferrous and non-ferrous alloys, expanded and seal-welded tubes in tube plates of different material specifications, and longitudinally finned tubes.

Other exhibits consist of weld specimens and 4-inch thick semi-elliptic pressed carbon steel end.

**AEROX Ltd, Glasgow, S.W.2** — **Stand 37 outer, Grand gallery**

**ALFA-LAVAL Co. Ltd, Brentford, Middx** — **Stand 5 H, Grand**

Some of the latest additions to the Company's range of centrifugal separators are on show. Of special interest to users of all types of lubricating oils, light and heavy fuel oils, insulating oils, and machine-shop oils are the following exhibits.

An automatic self-opening centrifugal separator is designed to eject separated solids from the bowl, on the water phase, without oil loss, while the machine is running at full speed. These separators are used as the first-stage purifier in De Laval two-stage purifier/clarifier installations for the treatment of heavy fuel oils for diesel engines, free-piston engines, and gas turbines. They are also used for the continuous by-pass treatment of lubricating oil.

A complete range of standard centrifugal oil separators is manufactured and the De Laval type B 1700 is shown.

A new laboratory centrifuge is shown. It follows the pattern of the Company's larger models and is very useful for laboratory or pilot-scale work.

Typical examples of the range of plate heat exchangers are on view. They have very high heat-transfer efficiency coupled with very small space requirement and can be used for recovery of heat by regeneration.

**ALLEN, ALFRED & SON Ltd, Dudley, Worcs.** — **Stand 5 P, National**

**ANDERSON L. M. & Co. Ltd,** **Stand 13 K,**
**Edgware, Middx.** **Grand**

**ANGUS, GEORGE, & Co. Ltd,** **Stand 27 inner,**
**Grays Inn Road, London, W.C. 1** **Grand gallery**

The emphasis is on fire-fighting equipment, mainly "Fire Fighter" hose and all types of fire extinguishers.

The range of Fire Fighter reinforced rubber-lined hose, used on many tankers both on land and sea, is produced in sizes from 1¼ to 3½ inches internal diameter and has a constant bursting pressure throughout the range of sizes.

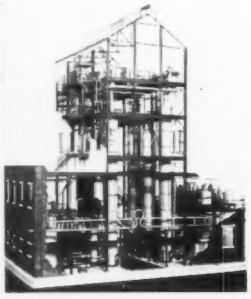
A new product is the Flame Fighter fire hose which is composed entirely of all-synthetic fibre yarns, but has a reinforced rubber lining. This hose is immune from mildew and does not require drying after use.

A complete range of dry-powder chemical fire extinguishers is on view, from the 5 lb capacity transport model to the 350 lb capacity model, which is mounted on wheels and fitted with a special four-way control nozzle. This machine is used for protecting oilfields. Both models, which have not been shown before, can deal with fires caused by oils, petrol, alcohol, solvents, and the powder used is non-conducting and non-toxic.

**APEX CONSTRUCTION Ltd,** **Stand 4 outer,**
**Soho Square, London, W.1** **Grand gallery**

**APPLETON & HOWARD Ltd,** **Stand 9 D,**
**St Helens, Lancs.** **Grand**

**A.P.V. Co. Ltd,** **Stand 5 G,**
**Crawley, Sussex** **Grand**



The most striking feature of the stand is a model of an 80-ft-high 4-ft-6-in.-dia. benzole distillation column which forms the centre of a display of models, plates, and photographs illustrating the Company's work in the continuous and batch distillation of coal-tar products and industrial and potable alcohol. The APV-West plate is shown in a number of types and sizes, supported by diagrams and an operating rig. The model of the Beckton Tar Acids Distillation plant on show was presented by the A.P.V. Co. to the Science Museum and has been loaned for the exhibition.

Heat exchangers are prominent and a variety of sizes of the Paraflow plate heat exchanger and the Rosenblad spiral heat exchanger, now manufactured by APV for the British and certain other markets, are on display.

Two bulk heat-transfer systems are on view. The APV-Heil in-wall cooling and heating system can be applied to a wide range of vessels and the Watts heater can create considerable circulation in a vessel with consequent high heat-transfer efficiency and low steam consumption.

The new plate evaporator, by using plates on the climbing and falling film principle, instead of tubes, requires only 8 ft of headroom.

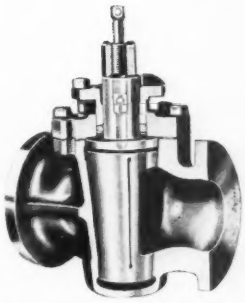
Also shown are stainless-steel valves, the APV Manton-Gaulin homogenizer and a range of "forging quality" cast stainless-steel butt-welding flanges, elbows, tees, and other pipe fittings, which conform to British and American Standards.

**ASHMORE, BENSON, PEASE & Co.,** **Stand 3 K,**
**Stockton-on-Tees** **Grand**

**ASHTON, N. C. Ltd,** **Stand 1 inner,**
**Huddersfield, Yorks** **National gallery**

**ASTRAL INDUSTRIAL METERS Ltd,** **Stand 21 inner,**
**Crawley, Sussex** **Grand gallery**

**AUDLEY ENGINEERING Co. Ltd,** **Stand 6 E,**
**Newport, Shropshire** **Grand**



Audco lubricated taper plug valves manufactured from a wide range of materials, including cast iron, carbon, alloy, and stainless steels, bronze, Monel metal, and aluminium are exhibited. These include straightway, multiport, and steamjacketed designs. Pressures from the finest vacuum up to 5000 psi are catered for and sizes range from ¼ to 24-inches bore.

A Christmas tree wellhead assembly is displayed, together with examples of remote-controlled, pneumatic, and electrically operated valves.

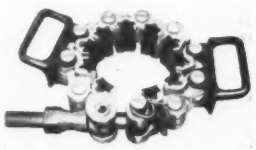
The sectional view of the valve in the illustration is of the standard Audco type.

**AUTO DIESELS Ltd,** **Stand 11 K,**
**Uxbridge, Middx** **Grand**

Auto Diesels Ltd, in conjunction with Leyland Motors Ltd, show equipment for oilfield use of particular interest to drilling contractors and petroleum engineers engaged in drilling and exploratory work.

A complete utility power house is on view, incorporating Leyland/Auto Diesels diesel generators. Individual generating equipment of the oilfield type and the Leyland engine in single and twin form for use on rigs and associate equipment is on display. All the engines have parts interchangeable with those on Leyland trucks.

**BAASH-ROSS TOOL Co. Ltd,** **Stand 2 O,**
**Harley Street, London, W.1** **National**



British-made kelly drive bushings for square and hexagon kellies are available. That shown is for 5¼-inch nominal API kelly size.

The rotary drill pipe slips have a wide range of interchangeability which permits one body size to be used for many drill pipe sizes by changing liners. A long slip of 7-inch size is shown to handle API pipes of from 4½ to 7 inch o.d.

The largest size of long drill collar slip, which is of multi-segment design to permit automatic adjustment, is on display together with three sizes of casing slips and safety clamps.

A swivel type double-tube core barrel for coring soft friable formations is shown in 5-ft lengths equipped with reamer shell blank, blank bit, and core lifter.

Diamond core bits and reamer shells are shown in their smallest size.

Two Joy-Sullivan single drum hoists are featured. The AW–80 was recently redesigned and has improved controls. Its weight is 85 lb, power is supplied by a 4-cylinder reversible air motor, and the hoist is 22 inches long.

The EW–111 single drum hoist gives a rope pull of 2000 lb and is powered by a 5-hp air motor. Its weight is 325 lb.

The illustration shows the type C Safety clamp.

**BABCOCK & WILCOX Ltd,** **Stand 8 P,**
**Euston Road, London, N.W.1** **National**

**BAKER PERKINS Ltd,** **Stand 5 F,**
**Peterborough** **Grand**

A range of mixing, heat exchanging, extruding, and sifting machinery is shown on this stand.

**BALFOUR, HENRY & Co. Ltd,** — **Stand 5 L, National**
**Artillery Row, London, S.W.1**

**BALFOUR LECOCQ Ltd,** — **Stand 5 L, National**
**(See Henry Balfour & Co. Ltd)**

**BARFLO Ltd,** — **Stand 24 outer, National gallery**
**Eastbourne, Sussex**

On display is the Company's new plastic tubing (Durapipe—styrene butadiene). This piping is tough, non-corrosive, and capable of withstanding high temperatures under reasonable pressure. It can be solvent welded to give a homogeneous joint.

**BELMOS Co. Ltd, The,** — **Stand 10 F, Grand**
**Bellshill, Lanark**

**BENN BROS Ltd,** — **Stand 4 inner, Grand gallery**
**Fleet Street, London, E.C.4**

**BENNETT, SONS & SHEARS Ltd,** — **Stand 5 B, Grand**
**Manchester Square, London, W.1**

**BERK, F. W. & Co. Ltd,** — **Stand 6 K, Grand**
**High Holborn, London, W.C.1**

Shown for the first time is a pilot plant spray dryer, which offers new designs for spray unit, air, and dried product recovery. The Berk fluid bed dryer will be in operation.

**BIRKETT, T. M. BILLINGTON & NEWTON Ltd,** — **Stand 8 K, Grand**
**Stoke-on-Trent**

**BIRLEC Ltd,** — **Stand 1 A, Grand**
**Birmingham, 24**

**BIRMINGHAM BATTERY & METAL Co. Ltd,** — **Stands 2A, Grand, 4 R, National**
**Old Broad Street, London, E.C.2**

**B.K.L. ALLOYS Ltd,** — **Stand 1 S, National**
**Birmingham**

On show are a range of Tubend tubular welding fittings. Elbows, tees, return bends, caps, and reducers are manufactured for the petroleum and chemical industries, to both British and American Standards in carbon, alloy, and stainless steels, aluminium, and Monel metal and meet the requirements of practically every type of pipe assembly.

There is an interesting display of magnesium and zinc anodes for cathodic protection of pipelines, ships, jetties, storage tanks, and other steel structures.

**BOORN, THOMAS & Co. Ltd,** — **Stand 5 inner, Grand gallery**
**Venn Street, London, S.W.4**

**BOULTON, WILLIAM Ltd,** — **Stand 14 inner, Grand gallery**
**Burslem, Staffs**

A new patent British machine for fine grinding with close control by high-frequency small amplitude vibrations is shown for the first time. It is claimed to represent a spectacular advance in fine grinding.

**BRITISH ACHESON ELECTRODES Ltd,** — **Stand 13 J, Grand**
**Sheffield, Yorks**

**BRITISH ALUMINIUM Co. Ltd, THE,** — **Stand 1 N, National**
**St James's Square, London, S.W.1**

**BRITISH CHEMICAL PLANT MANUFACTURERS ASSOCIATION,** — **Stand 3 F, Grand**
**Suffolk Street, London, S.W.1**

**BRITISH ERMETO CORPORATION Ltd,** — **Stand 2 L, National**
**Maidenhead, Berks**

**BRITISH INSULATED CALLENDER'S CABLES Ltd,** — **Stand 3 L, National**
**Bloomsbury Street, London, W.C. 1**

The BICC cabled copper tube system, as displayed, was developed to simplify installation and maintenance of tube connexions between gas-pressure and liquid-pressure operated instruments.

An all-insulated industrial wiring system is claimed to be completely watertight and virtually proof against fumes and corrosion.

Other exhibits include a paper-insulated range of cables for currents up to 33 kV, PVC telephone cables, PTFE cables, neoprene moulded couplers, and VR1 multi-core lead-covered cables.

Mineral-insulated cables and accessories, complete with corrosion-resistant terminal shrouds, and remote control cable to BS 708 are also featured.

**BRITISH LaBOUR PUMP Co. Ltd,** — **Stand 16 K, Grand**
**London, N. 7**

A new chemical pump is on view for the first time. It is specially designed for chemical service and particular attention has been paid to ease of maintenance. An important feature is that the impeller and internal components can be removed for inspection without disconnecting suction and discharge pipes or disturbing the motor.

The new pumps are available as flooded suction units and are augmented on the stand by other examples of British LaBour pumps for handling hydrochloric acid, ferric chloride solutions, etc. These pumps are Vulcoferran lined and are fitted with special mechanical seals which obviate the use of expensive metal alloys.

The type USL pump is made specially for use in mines and is designed to operate in confined spaces. It is self-priming, incorporates a special mechanical seal which does not require lubrication or external cooling, will run for long periods on "snore", and does not require a foot valve.

The type BG vertical pump functions without packed gland or mechanical seal and is useful where maintenance must be kept to the minimum, and for handling corrosive or dangerous liquors.

Sectional models showing how the pumps handle a high proportion of gas or vapour with the liquid are on view.

There are also vacuum extraction pumps and pumps made of corrosion- and erosion-resistant materials.

**BRITISH OXYGEN Co. Ltd,** — **Stand 4 B, Grand**
**St James's, London, W.1**

Prominence is given to plant used for the supply of high-purity oxygen and nitrogen in tonnage form. Smaller plants, which have capacities of 100 cu. ft of gas per hour and upwards, are also illustrated.

There is a graphic representation of the service provided by the Company in making plant available throughout the world.

Other exhibits illustrate the Company's other activities, including the supply of complete plant for rare-gas production, together with ancillary equipment, such as pumps, compressors, vaporizers, mobile liquid-oxygen tanks of 50 and 500 U.S. gallon capacity, and static liquid-oxygen storage tanks in the 1 million cu. ft. scale.

A model of a Rescol oxygen plant, which is capable of producing 100 tons of gas per day and which is now in service in British steelworks, is also on display.

**BRITISH STEAM SPECIALITIES Ltd, THE,** — **Stand 9 A, Grand**
**Leicester**

A comprehensive range of gunmetal and cast-iron flanged and screwed valves is shown. Also there are Bourdon-type pressure gauges, bi-metallic strip-actuated thermometers, and the Ventalarm whistling tank filling device.

The Vee-Reg globe valves are in bronze and steel, with a size range of ¼–10 inches, and fitted with vee-ported stainless-steel clack and seat. Also shown is the Vee-Reg Rotork electrically operated valve for remote control.

A full range of steam traps is available for all pressures up to 2500 psig and temperatures up to 1100° F.

The Velan forged and stainless-steel bonnetless stop valves can deal with pressures up to 5400 psi. The new Velan forged steel bonnetless gate valves have seats and wedge discs that can be interchanged in a matter of minutes. Sizes range from ½ to 2 inches and pressures up to 1500 psi can be handled.

**BRITISH VACUUM CLEANER & ENGINEERING Co. Ltd.**, Leatherhead, Surrey — Stand 34 outer, Grand

**BROADBENT, THOMAS & SONS Ltd.**, Huddersfield, Yorks — Stand 4 L, National

**BROOKER, W. J. Ltd.**, Westminster Bridge Road, London, S.E.1 — Stand 4 K, Grand

**BROWN BAYLEY STEELS Ltd.**, Sheffield — Stand 1 L, National

**BROWN, DAVID COMPANIES**, Meltham, Yorks — Stand 6 M, National

**BROWN, DONALD (Brownall) Ltd.**, Manchester, 15 — Stand 17 inner, Grand gallery

**BURTON DELINGPOLE & Co. Ltd.**, Old Hill, Staffs — Stand 1 D, Grand

**BURTONWOOD ENGINEERING Co. Ltd.**, Warrington, Lancs — Stand, 13 H, Grand

**CALMIC ENGINEERING Co. Ltd.**, Crewe, Cheshire — Stand 7 D, Grand

**CANNON (C.P.) Ltd.**, Bilston, Staffs — Stand 8 G, Grand

**CAPE ASBESTOS Co. Ltd.**, London, W. 1 — Stand 20 outer, Grand gallery

Presented on this stand are Caposite asbestos and Rocksil rock-wool thermal insulation materials, Vermiculux fire-proofing concrete, Asbestolux building board, Capasco brake and clutch linings, asbestos textiles and cements, jointings, and millboard.

A demonstration shows the ease with which even the largest Caposite asbestos pipe sections (26 inches in diameter) can be fitted direct to hot surfaces without an undercoat.

The Company also undertakes fitting of insulation.

**C. P. EQUIPMENT Ltd.**, Mitcham, Surrey — Stand 30 outer, National gallery

**CAPPER PIPE SERVICE & WELDING Co. Ltd.**, (See Appleton & Howard Ltd) — Stand 9 D, Grand

**CAPPER, W. H. & Co. Ltd** (See Appleton & Howard Ltd) — Stand 9 D, Grand

**CARLSON, JOHN C. Ltd.**, Ashton-under-Lyne — Stand 41 outer, Grand gallery

Amongst the range of sheet filters is the new Zenith Princess filter, constructed entirely in stainless steel.

**CASLAKE, J. Ltd.**, Bournemouth, Hants — Stand 8 A, Grand

**CHEMICAL CONSTRUCTION (G.B.) Ltd.**, London, W.C.2 — Stand 14 inner, National gallery

This stand emphasizes new processes for producing fertilizer grade urea. Plant for producing urea pills and crystal urea are available. Nitric acid concentration using magnesium nitrate will be grapically demonstrated.

**"CHEMICAL AND PROCESS ENGINEERING"**, Eden Street, London, N.W.1 — Stand 33 outer, Grand gallery

**CLARK, T. & C. & Co. Ltd.**, Wolverhampton — Stand 7 M, National

**COLDSTREAM ENGINEERING Co. Ltd.**, (See SILVERSON MACHINES (Sales) Ltd) — Stand 27 outer, Grand gallery

**COLVILLES Ltd.**, Glasgow, C.2 — Stand 14 H, Grand

**CONSOLIDATED PNEUMATIC TOOL Co. Ltd.**, Dawes Road, London, S.W. 6 — Stands 6 D and 8 E, Grand

Some entirely new lines of compressed-air plant, some new versions of established products, and a full selection of CP tools and compressors are shown.

The centre-piece of the new equipment section is a machine representative of an entirely new range of stationary compressors, known as the class FE. These are of horizontal, balance-opposed design, and for outputs up to 5000 cfm, or pressures up to 3000 psi can be obtained.

Exhibited for the first time is the complete range of Lagonda tube-cleaning equipment manufactured under licence in Britain. It embraces a series of air-powered motors covering straight and curved tubes from 5/8 to 6 inches in diameter. All types of cutter heads for use with these motors are shown.

It is also hoped to show for the first time a class of compressor built specifically for the oil industry as a high-pressure portable unit for field service for pressurizing or the "rocking" of wells.

There will be examples of modern rotary portable compressors. Demonstrations will show the use of some of the many pneumatic tools now available, particularly in regard to grinders and impact wrenches. Coupled with this will be demonstrations of Hicycle electric tools, showing their advantages in economic grinding.

Also shown will be selected models of air-powered tools of all kinds for production and maintenance, including construction equipment such as concrete breakers, rock drills, pick hammers, pumps, and vibrators.

The model 3500 heavy-duty tube expander has been specially developed for refinery service.

**CONSTRUCTORS JOHN BROWN Ltd.**, South Audley Street, London, W.1 — Stand 3 G, Grand

**COPPER DEVELOPMENT ASSOCIATION**, Scuth Audley Street, London, W.1 — Stand 14 outer, National gallery

**COUNCIL OF BRITISH MANUFACTURERS OF PETROLEUM EQUIPMENT**, Buckingham Palace Road, London, S.W.1 — Stand 4 E, Grand

Co-sponsors of the exhibition with the British Chemical Plant Manufacturers Association, the CBMPE is showing on this stand specimen publications of the Council, *British Petroleum Equipment*, *British Petroleum Equipment News*, *Classified List of Petroleum Equipment and Services Available in Great Britain*, and other literature on its work and activities.

Also on display is information and literature on the Federation of European Petroleum Equipment Manufacturers (FEPEM). There is a feature showing Standards produced by the Petroleum Equipment Industry Standards Committee of the British Standards Institution in conjunction with the CBMPE.

Founded in 1943 the CBMPE to-day represents over 400 companies engaged in the petroleum equipment industry and most of them are showing examples of their products at the exhibition.

**COVENTRY GAUGE & TOOL Co. Ltd.**, Coventry — Stand 1 B, Grand

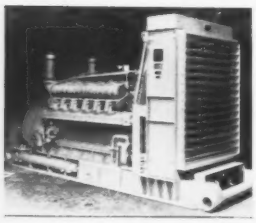
**CRAIG, A. F. & Co. Ltd.**, Paisley — Stand 3 outer, Grand gallery

**CRANE Ltd.**, Fleet Street, London, E.C.4 — Stand 6 F, Grand

**DALGLISH, JOHN & SONS Ltd.**, Glasgow — Stand 39 outer, Grand gallery

On show are conveyor and spray driers which can be used in a variety of materials from simple basic chemicals to complex organic compounds and food products. This equipment is newly available in Britain and the sterling area.

**DAVEY, PAXMAN & Co. Ltd,** **Stand 7 C,**
**Colchester** **Grand**



The main exhibit comprises three Drilpak 400 400 shp 12-cylinder oilwell drilling units arranged as the drive group to a type 80B drawworks and G700 slush pump exhibited by the Oilwell Engineering Co. Ltd. The engines will be running at intervals to show the whole rig in motion.

For chemical engineers there is a 10-sq. ft rotary vacuum filter, one of a large range of filters for extracting moisture from effluent slurries.

Other items on show are photographs and samples from the Company's welding bays: these range from high-pressure boiler drums made to Lloyds' A1 standards to fabricated vessels in non-ferrous metals for the chemical industry. Models and details of a range of water-tube and shell-type boilers are also on the stand. The Company produces a range of diesel engines with power outputs of from 130 to 2100 bhp.

**DELORO STELLITE Ltd,** **Stand 1 J,**
**Solihull, Warwickshire** **Grand**

The Company is demonstrating the hardfacing of sleeves, both by the spray-fuse process and the normal oxy-acetylene method. Samples will be available to take away for test purposes and simple components can be brought to the stand to be faced by the former method.

A representative range of Stellite faced and solid Stellite components will be on display to indicate the advances made with this alloy. A feature of the display is the wide range of valves protected with Stellite.

Castings produced by shell moulded, sand, and precision methods and a range of cutting tools, including the Stellite drill for the production of accurate holes in hardened steel, complete the exhibit.

**DEWRANCE & Co. Ltd,** **Stand 2 E,**
**Great Dover Street, London, S.E.1** **Grand**

**DOBBIE McINNES Ltd,** **Stand 5 J,**
**Glasgow, S.W.1** **Grand**

**DORMAN, W. H. & Co. Ltd,** **Stand 4 M,**
**Stafford** **National**

This concern is showing newly developed engines in turbo-charged form covering a range from 20 to 350 hp, which will soon be extended to cover from 20 to 700 hp.

**DORR-OLIVER Co. Ltd,** **Stand 3 R,**
**Wilton Road, London, S.W.1** **National**

Shown for the first time in Britain is a rotary vacuum drum filter in PVC construction, which offers a new solution to filtration problems where, for corrosion and other reasons, contact of the process material with metallic materials of construction must be avoided. Also exhibited is the Dorr-Oliver FluoSolids system, which is a new technique for roasting, calcining, and drying.

**DOUGLAS EQUIPMENT Ltd,** **Stand 6 O,**
**Cheltenham** **National**

**DOULTON INDUSTRIAL PORCELAINS Ltd,** **Stand 3 Q,**
**Tamworth, Staffs** **National**

A working model demonstrates some industrial uses of porous ceramics in processes such as gas diffusion, removing suspended solids from liquids, and filtering compressed air.

On show are porous ceramics, hard porcelain grinding materials, and acid-resistant stoneware. Hard porcelains are shown used as ball mills and linings for grinding mills and there is a ball mill of entirely new design.

Examples of grinding balls, ball-mill lining blocks, and cyclone nozzles—in a new alumina-loaded porcelain of superior strength and resistance to abrasion and thermal shock—are on view.

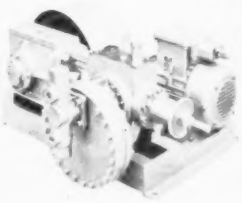
Actual units of chemical plant embodying acid-resisting stoneware and thermal shock-resisting stoneware indicate some uses of ceramics.

Special filter units have casings of rigid PVC, and there is a breather filter developed for use with HTP and approved by the Ministry of Supply.

A small-size aerating floor is on show and there is a selection of food containers, acid cocks, piping, and items of laboratory ware.

**DUNLOP RUBBER Co. Ltd,** **Stand 3 P,**
**New Bond Street, London, W.1** **National**

**E.C.D. Ltd,** **Stand 7 outer,**
**Tonbridge, Kent** **Gallery**



E.C.D. have developed a special diaphragm pump to meet individual specifications and which is able to withstand pressures up to 2000 lb/sq. in. The pumps are fluid operated and output is continuously variable.

Other pumps on display are a solenoid-operated plunger pump, a high-duty Duplex pump, a Simplex plunger pump, a diaphragm pump with micro-adjustment stroke control, and a treble-ram pump.

Also exhibited are a ring movement assembly, a movement assembly, and a laboratory ozone generator.

An ozone fan unit is suitable for offices, factories, shops, and hospitals and three models are in production.

A self-contained air conditioner in a walnut veneered cabinet is shown.

Finally there is a dissolved oxygen recorder which eliminates the disadvantages of measurement by chemical-reagent response or oxygen "scrubbing".

The E.C.D. diaphragm pump is shown in the illustration.

**EDWARDS HIGH VACUUM Ltd,** **Stand 23 inner,**
**Crawley, Sussex** **Grand gallery**

**EIMCO (Great Britain) Ltd,** **Stand 9 O,**
**Gateshead, 11** **National**

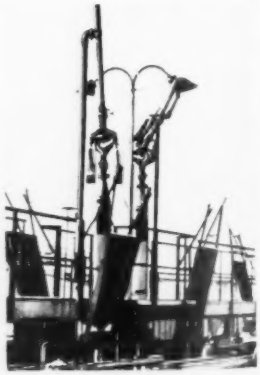
**ELECTROFLO METERS Ltd,** **Stand 31 inner,**
**Park Royal, London, N.W.10** **Grand gallery**

**ELGA PRODUCTS Ltd,** **Stand 14 K,**
**Railway Place, London, S.W.19** **Grand**

Newly developed units for ion exchange and de-ionization are shown. The Elgastat Field Research Unit provides high-quality distilled water without the use of power, and lake, well, or river water may be used as the influent.

**ELLIOTT BROS (London) Ltd,** **Stand 6 J,**
**Lewisham, London, S.E.13** **Grand**

**EMCO BRASS MANUFACTURING Co. Ltd,** **Stand 28 inner,**
**Margate, Kent** **Grand Gallery**



In 1949 Emco Ltd of Canada set up in Croydon the Emco Brass Manufacturing Co. Ltd to produce and sell to the U.K. and the sterling area the Emco Wheaton range of petroleum and oil-marketing equipment.

All Emco Wheaton products, wherever made, are to a common standard and are interchangeable.

On the stand are shown a B690 series sliding tube loading assembly, together with a model of a truck tank which demonstrates methods of loading and various Emco fluid-handling accessories.

From their storage-tank range there are a working model of the floating suction unit, with automatic tank gauges and allied fittings.

A typical example of rail-loading installation, in Germany, using counter-weighted loading arms, is shown in the illustration alongside.

**EMSCO ENGINEERING Co. Ltd,** **Stand 12 A,**
**St Albans, Herts** **Grand**

Various examples of oilfield drilling machinery are shown including ½ inch rotary machines, swivels, a travelling block, and a pumping unit.

Smaller exhibits comprise a Dual-Pac stuffing box and cable and percussion drilling tools.

**ENAMELLED METAL PRODUCTS CORP. (1933) Ltd** **Stand 5 L, National**
**(See Henry Balfour & Co. Ltd)**

**ENDECOTTS (Filters) Ltd,** **Stand 14 outer,**
**Kingston Road, London, S.W. 19** **Grand gallery**

In addition to Standard Testing Sieves to British and American Standards, the firm is showing sieves in stainless steel and nylon-coated sieves fitted with nylon weaving which are invaluable where resistance to abrasive and chemical action is required.

The Testing Sieves can be used for hand sieving and in the Company's sieve shakers which allow a rapid separation of particles with a press-button analysis.

Sieves to IP specifications are also on show.

**ENGLISH STEEL CORPORATION Ltd,** **Stand 12 J,**
**Sheffield, 9** **Grand**

Two forged-steel high-pressure autoclaves, one 15 ft 9 in. long and weighing over 8 tons and the other 12 ft 3 in. long and weighing over 7 tons, form the central features of the stand.

Other exhibits include three forged-steel drill collars and five substitutes for use in oil-well drilling. The longest of the collars is 30 ft and the shortest 10 ft. There are also two 13-ft diesel-engine crankshafts produced by the continuous grain-flow forging process, one as forged and the other as finish-machined. A sectioned portion of a 26-ft long hollow forged high-pressure boiler drum is also on display.

The Corporation, who specialize in manufacture of stainless-steel drop-forged valve parts, also show a number of typical examples of this class of product.

Photographs illustrate various processes, such as forging, machining, etc., employed to produce the exhibits.

**ENTWISTLE (Oldham) Ltd,** **Stand 11 J,**
**Oldham, Lancs** **Grand**

**EVERETT EDGCUMBE & Co. Ltd,** **Stand 10 F,**
**(See The Belmos Co. Ltd)** **Grand**

**EXTRUDEX Ltd,** **Stand 9 inner,**
**Bracknell, Berks** **National gallery**

**FARMER, S. W. & SON Ltd,** **Stand 12 inner,**
**Courthill Road, London, S.E.13** **Grand gallery**

This firm's contribution to the petroleum and chemical industries is in the field of structural steelwork and platework and can be considered under two main headings: refinery and process structures and oil heaters and furnaces.

Enlarged photographs show types of structures and heaters produced by the firm and other products on view include fire-escape staircases, balustrading, fireproof doors, gates, railings, foundation bolts, forged standards, machining, and profiling work.

**FARRINGDON WORKS, THE & H. PONTIFEX & SONS Ltd,** **Stand 5 B, Grand**
**(See Bennett, Sons & Shears Ltd)**

**FEDERATION OF EUROPEAN PETROLEUM EQUIPMENT MANUFACTURERS,** **Stand 4 E, Grand**
**Paris, France (See Council of British Manufacturers of Petroleum Equipment)**

**FELCO HOISTS Ltd,** **Stand 10 C,**
**Cromwell Road, London, S.W. 7** **Grand**

Specialists in the design and construction of lifting appliances, the Company show a range of tackle from chain blocks to travelling trolleys and ratchet hoists.

Of special interest are an equalizing sling which can handle loads of unusual size and shape, and can lift at almost any angle, and a quick-lift hydraulic lorry-loader which is designed to deal with drums, barrels, and casks.

A patent girder clamp which allows instant fixing on R.S.Js from 4 to 8 inches in depth is also on display.

**FENNER, J. H. & Co. Ltd,** **Stand 36 outer,**
**Hull** **Grand gallery**

**FIBREGLASS Ltd,** **Stand 13 inner,**
**St Helens, Lancs** **National gallery**

**FIRTH, THOS. & JOHN BROWN Ltd,** **Stand 1 E,**
**Sheffield, 4** **Grand**

**FIRTH CLEVELAND INSTRUMENTS Ltd,** **Stand 31 outer,**
**(See Simmonds Aerocessories Ltd)** **Grand gallery**

**FIRTH-VICKERS STAINLESS STEELS Ltd,** **Stand 4 D,**
**Sheffield, 9** **Grand**

**FISHER GOVERNOR Co. Ltd,** **Stand 6 J,**
**Rochester** **Grand**

**FLETCHER, GEORGE & Co. Ltd,** **Stand 13 E,**
**Derby** **Grand**

Prominent on the stand is the Amarilla rotary displacement pump for handling sludge, heavy oil, semi-fluids, and thick mixtures of slurry, pastes, etc. It has only two moving parts and models are available to handle from 500 to 6000 gph. Three pumps will be in operation.

Also shown is an electrically driven vacuum pump with a 24-inch bore and 12-inch stroke, which is made in a range of sizes from 370 to 4330 cfm.

Other products are autoclaves, stills, multiple-effect evaporators, crystallizers, vacuum pans, surface and barometric condensers, steam engines of the piston and Corliss-valve type, and high-speed $CO_2$ pumps. Heat exchangers, deep well pumps, vertical lime kilns, automatic liquid scales, heavy crushing mills for dehydration of plant fibres, and conveyors are also manufactured by the Company.

**FLEXIBOX Ltd,** **Stand 6 R,**
**Manchester, 17** **National**

The new RRH seal fitted with a special cooled sleeve is on show. The RR type mechanical seal operates at high temperatures, high pressures, and high speed without leakage.

Typical examples of Flexibox-fitted pumps and mixers employed in the oil and chemicals industries are shown. In a number of cases the stuffing boxes of these exhibits are sectioned.

A special seal incorporating components manufactured from polytetrafluoroethylene polymer and designed for equipment handling hot and corrosive fluids will also be on view. Such seals have been employed with complete success on many arduous duties as, for example, the handling of 90 per cent sulphuric acid at a temperature of 80° C and a pressure of 350 psig. Another particularly difficult service on which these seals are giving leak-free service over long periods is the handling of Dowtherm (ortho-dichlorobenzene) at temperatures up to 370° C.

**FLIGHT REFUELLING Ltd,** **Stand 20 A,**
**Blandford, Dorset** **Grand**

The firm will be demonstrating the latest developments in fuelling and defuelling. Also shown are an entirely new solenoid-operated 8-inch valve particularly suitable for hydrant systems where emergency shut-downs are frequently required. A new bottom-loading valve is also on view.

**FOAMITE Ltd,** **Stand 14 J,**
**Regent Street, London, W.1** **Grand**

**FOWLER, JOHN & Co. (Leeds) Ltd., Leeds, 10** — **Stand 6 G, Grand**

**FOXBORO-YOXALL Ltd., Redhill, Surrey** — **Stand 2 P, National**

The display includes ranges of indicators, recorders, controllers, and transmitters.

A graphic panel mounting the compact Consotrol range includes the integrally mounted recorder controller, a computing relay, and the 14A integrator. The panel has an open back allowing close examination of the instruments, their layout, and mounting, and the methods of piping and wiring used.

The new mercury-less bellows-type diaphragm flow-meter measures a range of differential pressures from 20 to 200 inches of water at static pressures up to 2000 psi.

A series of rectangular-cased recorder controllers is shown with the newly designed pneumatic indicating controller which has a control unit capable of on off action and a proportioning mechanism with an adjustable band from a quarter of 1 per cent to 25 per cent of scale range.

The range of pneumatic transmitters includes a new direct-mounted liquid-level transmitter operating on the force balance principle and transmitting an output air signal to standard receivers, recorders, and controllers. It is specially suited for measurement of viscose and slurry-type liquids.

The magnetic flow-meter measures the flow rate of electrically conducting fluids, such as corrosive acids, rayon viscose, rock and acid slurries, etc.

The stand is completed by a variety of diaphragm and cylinder operated control valves, low-temperature valves, and Vernier Valvactors and power positioners.

**FRASER, W. J. & Co. Ltd., Romford, Essex** — **Stand 2 C, Grand**

The Fraser service covers work from flow-sheet to clients' take-over and includes design, engineering, instrumentation, fabrication, purchasing, expediting, erection, and commissioning, which may be utilized separately or collectively.

Exhibits include models, diagrams, and photographs of large and medium-scale process plant engineered by Fraser throughout the world, and a ten-minute version of the Fraser film, *Experience at your Service*. Among the models shown is one of a plant for the desulphurizing of coke-oven gas which Frasers are engineering and constructing under licence from the Appleby-Frodingham Steel Company. Also on view is the model of a fertilizer plant now being completed in New Zealand.

A section of the stand is devoted to Frasers' fabrication and pilot-scale development facilities.

As examples of Frasers' large range of special-purpose plant items two working models are shown—the Nauta mixer and the Fraser pin granulator.

The Nauta is a counter-current mixer for liquid-solid or solid-solid mixing, and the Fraser pin granulator is a novel machine, primarily intended for use as a pre-granulator, developed in co-operation with Scottish Agricultural Industries Ltd.

**GARDNER, WM. & SONS (Gloucester) Ltd., Gloucester** — **Stand 6 N, National**

Designers and manufacturers of an extensive range of mixing, sifting, drying, grinding, and other types of machines and plant, the Company's main exhibit is a 14-ft diameter stainless-steel double cone mixer. This particular model is for export and will be used in the plastics industry.

For comparison is an 8-inch stainless-steel double cone laboratory mixer, the smallest of the type produced by the Company, which will be shown in operation.

Also on the stand are a 6-ft length band conveyor with 4-speed reversing gear-box and magnetic clutch, entirely designed and made by the Company.

**GASCOIGNE, GEO. H. Co. Ltd., Reading, Berks** — **Stand 8 inner, National gallery**

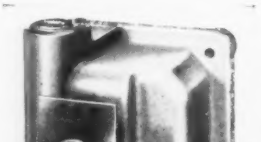
**GENERAL DESCALING Co. Ltd., Worksop, Notts** — **Stand 15 outer, Grand gallery**

The main function of this Company is to provide a complete service for cleaning sewers, drains, culverts, and industrial pipelines. They also manufacture oil pipeline equipment, including scraper traps, and closures, gauging, cleaning, swabbing, and batching pigs, go-devils, and magnetic and isotope type pig detectors.

The stand illustrates both aspects of their business. The display on the oil pipeline side includes a launching trap fitted with a closure and one of the latest designs of pig.

The theme of the industrial pipeline descaling side is the latest lightweight rotary boring machine, specially designed for cleaning of mains up to 6 inches in diameter. To this machine are connected flexible boring rods and at the end of these the blockage clearing tool so that a powerful rotary boring action can be imparted from the surface.

**GENERAL ELECTRIC Co. Ltd., Kingsway, London, W.C.2** — **Stand 6 Q, National**



A typical installation is shown of the G.E.C. pressurized system for feeding mains-operated electrical apparatus in situations where hydrogen (representing also town gas, coke-oven gas, and blue-water gas) is present. The system can be applied to lighting installations or equipment which is suitable for pressurization at ¼ lb/sq. in. Main components consist of pressure switches, a barrier box, and a control unit.

Exhibits of control gear include a motor-control centre as supplied for use in refineries. The cubicles comprising the control centre will accommodate a wide range of starters, reversers, switch fuses, etc.

Also shown is an automatic flameproof gate-end panel for the control of squirrel-cage motors at from 400 to 650 V with full-load currents up to 80 A. The panel carries the Ministry of Fuel and Power certificate for Group 1.

Motor exhibits include a squirrel-cage splash-proof machine of a type supplied for driving beam-type well pumps in oilfields. These motors provide a starting torque double that of their full-load value.

The G.E.C. Litealarm warning system, shown in the illustration, is also on display. These units have been developed for use in oil refineries and elsewhere if an explosion hazard exists and it is desired to give audible and visual warning of conditions developing which might cause danger. The unit is designed to BS 229 Group II and III (Buxton FLP certificate 281/1/2) and is also certified by the Ministry of Fuel and Power as flameproof for use in methane (Group 1), certificate FLP 3253/1.

A safe portable working and inspection light is the breast battery lighting set which is certified by the Ministry of Labour and National Service (Factory Department certificate 156) as intrinsically safe in respect to pentane (representing also butane, hexane, heptane, acetone, carbon monoxide, *cyclo*hexane, and benzene) and inflammable petrol vapour.

Other exhibits are an extractor fan, conduit tubing, heaters, and cables.

**GILBARCO Ltd., Tottenham, London, N.17** — **Stand 16 outer, Grand gallery**

A full range of positive-displacement Brodie-Kent metering equipment is shown. Meters with outputs of from 10 gph to 500 gpm are shown, including a new model B-82-D on show for the first time.

An entirely new feature is exhibited. This consists of equipment for completely automatic and remote control of bunkering, loading, and other operations. A working example of a remote-controlled loading rack system will be on show. This includes punched-card control of the complete operation, visual indication of quantities passed and of operations in progress, together with automatic recording by electric typewriter.

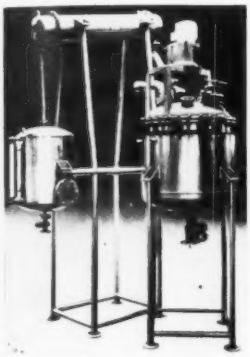
There is also a full range of meters for batch control, drum filling, boiler installations, and vehicle refuelling.

**GIRDLESTONE PUMPS Ltd,** **Stand 7, inner**
**Davies Street, London, W.1** **Grand gallery**

Shown for the first time is a self-priming centrifugal pump, available in different metals, including cast-iron, gunmetal, zinc-free bronze, and stainless steel. It incorporates mechanical shaft seals exclusively and is capable of drawing a high vacuum and delivering against heads up to 60 ft. A working model is on display.

Also exhibited are examples of pumps and float-switches. Of special interest is a glandless diaphragm pump for handling corrosive and abrasive fluids.

**GIUSTI, T. & Son Ltd,** **Stand 5 N,**
**Kings Cross, London, N.7** **National**



Equipment selected from normal production is shown, with emphasis on distillation plant.

There is a 1000-gallon reaction vessel, with stainless-steel column and condenser. The vessel has a stainless-steel spiral jacket of unique construction which offers exceptional advantages for heating under pressure.

A second plant consists of a 50-gallon stainless-steel still with inner vessel for use with vacuum or pressure and a jacket for heating by steam. Working in conjunction with the reaction vessel will be a 30 square ft vapour-in-tube type condenser and a 30-gallon stainless-steel receiver.

There will also be examples of stainless-steel vessels, heat exchangers, and equipment having special features.

A section of the stand will be devoted to industrial separators and clarifiers made by Wesfalia Separator AG, for whom T. Giusti & Son Ltd are U.K. agents.

**GRIFFIN & GEORGE Ltd,** **Stand 19 inner,**
**Wembley, Middlesex** **Grand gallery**

Prominent on the stand is the Griffin VPC gas-liquid chromatographic apparatus.

Shown for the first time is the Griffin-Raleigh water deionizer, a mixed resin ion-exchange unit designed for regeneration *in situ*; it incorporates a built-in conductivity indicator with a.c. bridge circuit.

The Griffin-BCRA bomb calorimeter is a work-studied design built into a bench for use by a seated operator, and is capable of determinations on coal, coke, oils, etc., with standard deviations of less than 0.1 per cent.

Other exhibits include the Autopoise centrifuge, the Modulat oven, a thermostatic oven, a fractional distillation column, gauze rings, flask shakers and laboratory stirrers, and laboratory furniture in wood and metal.

**GUMMERS Ltd,** **Stand 32 inner,**
**Rotherham, Yorks (See L.P. Gas Equipment Ltd)** **Grand gallery**

**HAMPTON, C. & J. Ltd,** **Stand 33 inner,**
**Sheffield, 2** **Grand gallery**

**HANDS-ENGLAND OILFIELDS EQUIPMENT Ltd,** **Stand 5 O,**
**Letchworth, Herts** **National**

**HARVEY, G. A., & Co. (London) Ltd,** **Stand 1 F,**
**London, S.E.7** **Grand**

Attention is drawn to the vacuum/pressure vessel on show, which is entirely of welded construction, weighs some 23 tons, and is made from mild steel plate $\frac{3}{8}$ inch thick and heavier.

Heavy-duty Rotarprest heads are featured by the display of a 12 ft-9 in-dia. dished end made from 4 plates welded together of $1\frac{1}{2}$-inch-thick Colclad, which consists of a layer of austenitic stainless steel bonded to boiler quality mild steel. Such steels are used to resist high pressure in conjunction with resistance to corrosive media. The range of heads produced by this process is up to 15 ft dia., using a 17 ft 6 in. blank and in thicknesses up to 4 inches.

Techniques for both destructive and non-destructive inspection have been developed and a display of laboratory specimens, radiographs, and micrographs illustrates this aspect of heavy fabrication and includes a section of a high-pressure vessel. This vessel section is shown as set up for radiographic examination of the welds, utilizing Panatron equipment for gamma radiation of welds and castings, etc., by Nuclear Engineering Ltd, an associate company.

An extensive range of Harco perforated metals and plastics is exhibited. Another product is Harco woven wire cloth in all meshes and gauges and in all metals. Of special interest are the heavy special quality wire screens used for vibrators. These screens give a far longer life in service under the most exacting conditions than ordinary mild steel.

Wirework of various kinds is a speciality of the Company and includes machinery guards, radiator covers, pipe guards, baskets, and carriers for many manufacturing processes. A range of Harvey steel office and factory equipment is also shown.

**HATHERNWARE Ltd,** **Stand 3 B,**
**Loughborough, Leics** **Grand**

Shown for the first time is the Company's Fibresin stoneware plant, which is reinforced with a wrapping of glass fibre and resin.

**HAYWARD TYLER & Co. Ltd,** **Stand 2 J,**
**Luton, Beds** **Grand**

Types of pump on display include a centrifugal oil cargo pump which can handle up to 2000 tons of sea water per hour at 140 lb/sq. in., a refinery pump, which is available in capacities up to 5000 gpm, and chemical pumps with outputs up to 350 gpm and heads up to 300 ft.

Steam turbines from 5 to 1200 bhp are also produced by the firm.

Other exhibits on the stand are a glandless motor pump unit for boiler circulator and reactor coolant systems and for loop tests, and submersible borehole and dewatering pumps for heads up to 1500 ft. Fire-fighting pumps are also available.

**HEAD WRIGHTSON PROCESSES Ltd,** **Stand 4 P,**
**Baltic Street, London E.C.1** **National**

Head Wrightson Processes Ltd, a member of the Head Wrightson group of Companies, act as consultants and contractors to the petroleum, petrochemical, chemical, and nuclear industries. The Company can provide a service ranging from the initial planning stage of a project through the designing, engineering, purchasing, inspection, shipping, erection, and commissioning phases. Amongst the current contracts are a large number for nuclear research reactors and allied plant, and a model of the DIDO reactor engineered and supplied by HWP is exhibited.

In addition to carrying out complete projects the Company designs and supplies specialized equipment such as Counterflo cooling towers, Fin-Fan air-cooled heat exchangers, Convetube furnaces, FP pulzation dampers, HW heat exchangers, etc.

A working scale model and a specially prepared colour and sound film of the internationally known Fluor/HWP cooling tower will be shown. These exhibits illustrate the dependability of the design and the close attention paid to detail during the stage by stage manufacture and construction.

**HERBERT, ALFRED Ltd,** **Stand 9 J,**
**Coventry** **Grand**

**HEYWOOD & Co. Ltd,** **Stand 20 inner,**
**Russell Street, London, W.C. 2** **Grand gallery**

**HINDLE, JOSHUA & SONS Ltd,** **Stand 11 G,**
**Leeds, 1** **Grand**

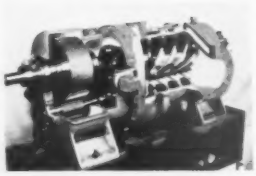
**HIPKISS BROS Ltd,** **Stand 1 outer,**
**Birmingham** **Grand gallery**

**HOLROYD, JOHN & Co. Ltd,** **Stand 12 G,**
**Milnrow, Lancs (See Manesty Machines Ltd)** **Grand**

**HONE, F. J. & Co. Ltd,** **Stand 18 inner,**
**Eldon Park, London, S.E.25** **Grand gallery**

**HORWITCH SMITH & Co. Ltd,** **Stand 5 S,**
**Brierley Hill, Staffs** **National**

**HOWDEN, JAMES & Co. Ltd, Glasgow, C.5** — **Stand 5 R, National**



The Howden compressor, a rotary positive-displacement machine, was developed as an oil-free compressor exhauster to handle many gases associated with the chemical and petrochemical industries.

It consists of two helically fluted rotors, one "male" and one "female", housed in a casing and arranged to run with a clearance between each other and between the rotor tips and the casing. These clearances are maintained by timing gears having a backlash considerably less than the inter-rotor clearance. The compression chamber is, therefore, kept dry and the gas being handled is uncontaminated by lubricating oil from the bearings.

Shaft sealing is by solid carbon rings shrunk into a steel outer ring. These rings can be arranged to permit "packing" gas to be inserted at suitable points if 100 per cent sealing is required. The amount of leakage without "packing" is small.

The operating cycle of the compressor is similar to that of a reciprocating compressor. The gas is delivered with a non-pulsating flow, thus eliminating, in most cases, the need to install a receiver. There are no valves on the compressor.

The standard range covers outputs from 800 cfm to 8500 cfm with outlet pressures up to 60 psig on a single stage and up to 150 psig in two stages, when inlet conditions are atmospheric.

As an exhauster with atmospheric inlet the machine is suitable for sub-atmospheric inlet pressures down to 24 inches Hg. vacuum (3 psia or 0·21kg/cm²abs.).

**HUGHES TOOL Co. Ltd, 73 Cheapside, London, E.C. 2** — **Stand 19 outer, Grand gallery**

The Company is exhibiting a comprehensive range of rock bits that are currently being produced at their Belfast works, and stages in their manufacture and assembly are also shown.

Rock samples on display indicate bottom-hole patterns cut by various types of rock bit in different formations.

Tool joints, manufactured by the parent Company, Hughes Tool Co. of Houston, Texas, demonstrate the background of American experience and research available to the British Company, and which is incorporated in the products made in the United Kingdom.

**HUMPHREYS & GLASGOW Ltd, London, S.W. 1** — **Stand 4 O, National**

A model of the plant to be built at Partington, to produce gas by hydrogenation of oil or low-grade coal, is displayed.

This £2,000,000 plant, which resembles a modern chemical plant rather than a conventional gasworks, will be in operation by the beginning of 1960.

Also featured is the £6,500,000 Lurgi plant at Westfield in Fife. Being built for the Scottish Gas Board, it will produce high pressure gas, using low-grade opencast coal from an adjacent site.

A model is shown of plant being designed and erected at the new Fuel Research Station, Stevenage, to produce 72,000 cu. ft.—120,000 cu. ft. of synthesis gas per day.

Details are given of a complete mine car handling plant installed by the company at Glyncorrwg in South Wales for the South Western Division of the National Coal Board. This plant is run entirely by hydraulic power instead of by compressed air.

**HYDRONYL SYNDICATE Ltd, Gloucester Road, London, S.W.7** — **Stand 2 N, National**

Lessing and Raschig type tower packings in materials suitable for use with all kinds and concentrations of chemicals are shown.

Hy-Contact catalyst support balls for use in reactor vessels are displayed in a range of sizes from ¼ to 1 inch.

Two new types of packing have been introduced: Intalox saddles and pall rings. Intalox saddles, tested and proved in America, are now made in Britain of iron-free porcelain.

The Company make triple spiral rings and cross-partition rings and a wide variety of packings for use in columns of small diameter.

An interesting novelty for small-scale work is Borad double gauze rings developed by the British Oxygen Co. and made by Hydronyl. These rings, made of stainless steel or phosphor bronze, are self-irrigating due to capillary action and a column packed with such rings is ready for immediate operation without pre-flooding.

**HYGROTHERM ENGINEERING Ltd, Upper Brook Street, London, W. 1** — **Stand 1 M, National**

The Company undertake design, supply, erection, and commissioning of complete chemical plant, particularly plant in which heat transfer is the main unit operation.

A 1 million Btu/hour patent heat generator, complete with burner is on show. These heat generators are designed for use with organic heat transfer media up to a temperature of about 700 F.

The Hygrotherm hot-salt system is also on view. This is designed for uses where organic heat transfer media are unsuitable and inorganic materials must be used. A working model demonstrates a patent system in which heat is transferred by a medium solid at room temperature into which a solvent is incorporated on cooling in order to maintain the liquid phase.

Another working model demonstrates the Company's patent vapour separation system which reduces pump cavitation in high-temperature heat-transfer systems.

**IGRANIC ELECTRIC Co. Ltd, Bedford** — **Stand 26 inner, Grand gallery**

**IMPERIAL CHEMICAL INDUSTRIES Ltd, London, S.W. 1** — **Stand 9 G, Grand**

The stand is largely devoted to products for chemical and petroleum engineering made by ICI Metals Division and by Marston Excelsior Ltd, an ICI subsidiary.

Prominently featured are examples of the use of titanium in chemical plant. Because of its exceptional resistance to a wide variety of aggressive liquids and gases, ICI titanium is now being used increasingly for complete components and as lining material. Products displayed include large lined vessels and a variety of fabricated products such as valves and valve plates, gas nozzles, agitators, anodizing jigs, and complete heat exchange units.

Examples of Kynal aluminium and aluminium alloy products include fabricated pipework, vessels, heat exchangers, and wrought forms such as busbar, heat-transfer sheets, structural extrusions, profiled building sheets, and treadplate.

Of particular interest to heat-exchange engineers are Integron finned tubing in steel, aluminium and bi-metal, and Tube-in-Strip, ICI's latest heat-transfer material.

ICI Metals Division also show wrought forms of new metals—zirconium, niobium and tantalum—developed for nuclear engineering but equally promising as materials for plant handling corrosive chemicals.

Bursting disks, Marlite flexible tanks, and Durestos laminated plastics, are shown by Marston Excelsior Ltd.

ICI Paints Division have chosen the theme "Paint Backed by the Technical Resources of ICI" for their display. The use of these resources in all aspects of paint formulation, production and application is illustrated—with particular reference to the problems of the chemical and petroleum industries. A comprehensive selection of paints for these industries is on show.

**INCLEDON, H. & Co. Ltd, West Drayton, Middx** — **Stand 20 inner, National gallery**

**INDUSTRIAL DESCALING TOOLS Ltd and H. WILLIAMS & SON, Ltd, St Albans, Herts** — **Stand 28 outer, Grand gallery**

Industrial Descaling Tools Ltd is the selling organization for H. Williams & Son Ltd and the complete range of Lark compressed-air and electrically driven tube cleaners, with a wide selection of accessories, such as cutter heads, drills, etc., is shown.

Both straight and curved tubes from ½ to 16 inch i.d. are within the range of Lark products; there are outside mounted machines

with hollow high-tensile-steel driving shafts, tungsten carbide tipped and high-speed drills recommended for the removal of heavy deposits from small bore straight tubes.

This Company is also exhibiting a new design of compressed-air driven surface scaling and chipping machine, suitable for dealing with all types of external surfaces, such as chemical vats, tanker decks, etc.

**INTERNATIONAL PAINTS Ltd,** **Stand 3 S,**
**Grosvenor Gardens, London, S.W. 1** **National**

International Paints Ltd and International Paints Exports Ltd feature a dramatic display of enlarged photographs telling a visual story of how International products are used throughout the world for protection and decoration of vital plant, from the time the oil is drilled until it reaches the customer.

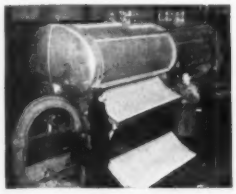
Many refineries in Britain and abroad are illustrated, and there are photographs of oil tankers of the world's largest fleets.

Details are available of the new series of epoxide-resin based paints that are resistant to water, petrol, and most chemicals.

**INTERNATIONAL PAINTS EXPORTS Ltd,** **Stand 3 S,**
**(See International Paints Ltd)** **National**

**INTERSCIENCE PUBLISHERS Ltd,** **Stand 3 outer,**
**Chancery Lane, London, W.C.2** **National gallery**

**ISOPAD Ltd,** **Stand 7 K,**
**Boreham Wood, Herts** **Grand**



Several new developments in electric surface heaters are shown. One of the latest applications of Isopanels is to road tankers used for the transport of heavy oils and other viscous fluids. The heating panels are powered by a small generating set mounted on the tanker. Irrespective of ambient temperature and the distance covered, even the most viscous liquids can be discharged easily on arrival.

A wide range of Isotapes is displayed. These tapes, which are made up to 200 ft long and from 1 to 4 in. wide, are recommended by leading oil companies for heating pipelines. Various types of tape cover practically all applications for both indoor and outdoor use. At the other end of the scale will be what is claimed to be the largest electric surface heater ever made. Consisting of several rail-mounted sections, this unit is designed for testing 15-ft high, 60-inch valves at temperatures of up to 400 C.

Isomantles of similar construction for process vessels up to 15 tons capacity are available for all standard vessels made by leading plant manufacturers. Several such heaters are on view, together with specially shaped units developed in co-operation with makers of pumps, valves, mixers, metering instruments and similar equipment, to ensure their efficient heating.

The display includes Isomantles for drums, both horizontal and vertical, as well as examples from the popular range of laboratory heating mantles. All Isomantles are available in a special patented version suitable for use in flame-proof areas, several of which are on view. There is also a representative selection of control equipment, from purely manual to fully automatic, to provide for uniform temperature or thermal cycling under any process conditions. Used in conjunction with electric surface heaters, such controls open the way towards automation of thermal processes.

**I. V. PRESSURE CONTROLLERS Ltd,** **Stand 22 inner,**
**Isleworth, Middx** **Grand gallery**

**JENKINS, ROBERT & Co. Ltd,** **Stand 12 outer,**
**Rotherham, Yorks** **Grand gallery**

**JENKINSON, W. G. Ltd,** **Stand 3 J**
**Sheffield, 1** **Grand**

**JERGUSON TRESS GAGE &** **Stand 11 inner,**
**VALVE Co. Ltd,** **Grand gallery**
**Sackville Street, London, W. 1**

The liquid level gauges on show range from conventional tubular glass models to flat-glass reflex types showing level black against a mirror-like surface, and transparent types indicating colour and interface of liquid.

Special function products include:—

*Non-frosting gauges* for use with low temperature fluids, a special unit prevents frost building up across the vision slot.

*Large chamber gauges*, designed particularly for reading levels where the fluid boils or surges.

*Heated and cooled gauges* for special conditions where heating or cooling of liquid is required to speed the flow.

*Welding pad gauges* for use where the gauge is required as an integral part of the vessel, *e.g.* for solids in suspension.

*Explosion-proof illuminators* which give an even diffusion of light over the entire length of the gauge.

*Water columns*. High and low water alarms operated by mechanical means.

A variety of gauge valves suitable for all processes.

In addition, there will also be a full range of the well-known "Iresco" forged steel process valves. These valves, are designed specially for the control of fluids and gases now used at high pressures and temperatures in chemical and petroleum processes.

**JESSOP, WILLIAM & SONS Ltd,** **Stand 17 outer,**
**Sheffield** **Grand gallery**

**JOHNSON, A. & Co (London) Ltd,** **Stand 3 N,**
**London, W.3** **National**

The special-purpose Votator scraped-surface heat exchangers will be shown for the first time in Britain. These are manufactured under licence from the Girdler Process Equipment Division, Louisville, Kentucky. Present production includes machines with heat-transfer surfaces of up to 9·5 sq. ft per cylinder. The model, with 36 sq. ft of heat-transfer surface, is provided with a flooded ammonia jacket and ammonia control system.

Products handled on Votator equipment are phenolic, formaldehyde, alkyd, melamine, vinyl and wax resins, viscose, rosin, gelatine, and petrolatum. Controlling of reaction heat has been accomplished in the manufacture of phenolic resins and in the polymerization of linseed oil, esterification of rosin, sulphonation of organic compounds, and in the alkylation of petroleum products.

A double scraper Votator grease cooler is also shown. This can cool between 2000 and 8000 lb of grease per hour.

There is a transparent working model of a Votator heat exchanger which will permit observation of the effect of the whirling scraper blades when a product is being pumped through the cylinder.

**JOHNSON, MATTHEY & Co. Ltd.** **Stand 11 H,**
**London, E.C. 1** **Grand**

Emphasis is on the applications of platinum and its alloys. Among the exhibits are platinum catalysts gauzed nets, in sizes up to 3 metres diameter, used in the catalytic combination of methane, ammonia, and air.

Supported platinum and palladium catalysts on a variety of bases, including charcoal, silica gel, alumina, and asbestos are displayed. There are also on view silver in crystalline and gauze forms as supplied for the production by catalysis of formaldehyde and other aldehydes.

Examples are shown of platinum employed for crucibles and other equipment required in the manufacture of high-quality glasses and for lining tanks, spouts, and tweels.

The use of platinum metals in anode construction for the cathodic protection of ships, harbour installations, and chemical plant is illustrated, together with platinum-sheathed copper electrodes for use in important electrochemical processes.

Noble metal thermocouples are displayed which include combinations of rhodium and platinum, palladium-gold, and iridium platinum.

A wide range of certified bursting disks, holders, and supports is on view and their functions are illustrated by a high-speed film and a demonstration of the bursting of small disks.

The stand includes a number of examples of the use of silver for the protection of constructional materials employed in the chemical-process industries.

A selection of high-purity chemical compounds, including compounds of precious metals, minor and rarer metals, and rare earths is shown. The display is completed by Specpure spectrographically standardized substances and Matthey standards for analysis.

**JOHNSON, S. H. & Co. Ltd,** **Stand 4 A,**
**Stratford, London, E.15** **Grand**

**K. & L. STEELFOUNDERS & ENGINEERS Ltd,** **Stand 2 M,**
**Letchworth, Herts** **National**

The engineering division of this Company builds the range of Jones cranes, but the stand is devoted to displays of steel castings made for the chemical and petroleum industries.

A fluid end cylinder is shown for a duplex double-acting slush pump to be used with an oil-well drilling rig. It weighs 3½ tons and, after machining, is subjected to hydrostatic pressure of 5250 lb/sq. in. The material is special carbon steel.

A hook body for oil-well drilling rig hook block assembly has a safe load capacity of -00,000 lb, and weighs 13½ cwt. The casting must be free from the slightest surface defect.

Three valve bodies are the 8 inch, weighing 3 cwt, the 14 inch, weighing 5¼ cwt, and the 16 inch, weighing 8 cwt.

In addition, there is a miscellaneous collection of cast-steel components for oilfield and refinery use. The Company make low-alloy, carbon, and high-alloy steel castings to any heat treatment and their range of over 400 machine tools enables them to supply partially or fully machined castings where required. K. & L. Steelfounders & Engineers Ltd also make steel for heat-exchanger parts, steel headers for distillation and cracking plant, steel valve and cock bodies and parts, and furnace tube supports.

**KEK Ltd,** **Stand 18 A,**
**Manchester, 12** **Grand**

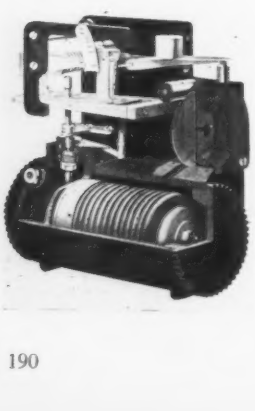
**KELLOGG INTERNATIONAL CORPORATION,** **Stand 6 outer, Grand gallery**
**Chandos Street, London, W.1**

Films and models are the highlights of this stand. Two films, both in colour, will be screened on alternate days. The first, *Project North Star*, briefly describes the design steps and then treats in full construction of a complete oil refinery in Canada. It emphasizes the importance of an oil refinery to a local economy. The second, *The 450 ton Lift*, gives a detailed report of a project that required lifting a 450-ton 314-ft-long vessel to 155 ft, and holding it in that position for 6 weeks.

The model, to a scale of ⅜ inch to 1 foot, is 10 ft long and represents a major portion of a new ethylene plant. It demonstrates, for the first time in Britain, the Kellogg technique of using prefabricated plastic components for models of petroleum or chemical plant.

The contributions of the Company to the design, engineering, and construction of ethylene plants are shown with particular reference to those plants for which Kellogg have been responsible in the U.K., on the Continent, and in the U.S.A.

**KENT, GEORGE, Ltd,** **Stand 10 E,**
**Luton, Beds** **Grand**



The greater part of the stand is devoted to the Commander range of instrumentation, one section of which gives a demonstration of the interchangeability of the standardized units and assemblies.

One example of the Commander range consists of four instruments which comprise a mass-flow computing installation. A differential-pressure instrument measures the head across an orifice, the measurement being corrected by two further instruments dealing with pressure and temperature. The final reading is given on a Commander receiver.

Other instruments on view include a high-speed self-balancing electronic recorder, a flow recorder-transmitter, and a flow recorder-controller. A demonstration of telemetering is given by a Commander electric transmitter working with a receiving indicator, integrator, and miniature recorder.

Auxiliary assemblies for the Commander range exhibited are a pneumatic controlling unit, integral-desaturators and control signal limiters as plug-in units, electric integrators, pressure-set adjusters, and the new mark 30 auto/manual test/service station and load-distribution sub-panel.

Fuel/air ratio control is illustrated by means of an RTE ring-balance instrument with a transmitting unit and pneumatic control unit.

A U-tube comparison unit shows visually the pressure-recovery during flow measurement of Venturi tubes, Dall tubes, and the new Dall orifice.

The CM and M2 oil meters are on view, together with a rotary-shunt steam-meter.

The illustration shows one of the new Kent mark 30 air-operated control units.

**KESTNER EVAPORATOR & ENGINEERING Co. Ltd,** **Stand 10 E,**
**Grosvenor Gardens, London, S.W. 1** **Grand**

A special item is a full-scale patent evaporator handling sulphuric acid which, after the exhibition, will go into immediate production. The calandria on the plant has tubes of inert graphite, and the whole construction including vapour pipes, condenser, etc. is made of Keebush material.

A second item is a double-circulation climbing film evaporator for use in laboratories and for small-scale production of antibiotics, pharmaceuticals, etc. which require evaporation under very low temperature short-time heating conditions.

Equipment consisting of a standard solvent recovery unit arranged for electric heating with the new Kestner Isoductive system is shown.

Other items are an automatic gas washer, a Kestner-Johnson patent metallic nitrate pilot plant, which it is hoped will be in operation to show the dissolving of metal and the formation of the nitrous fumes in the reactor, and a laboratory spray drier incorporating the Kestner high-speed centrifugal atomizer.

There will be a glass and transparent plastic model of the TV drier. Other operating equipment will be a tank with a glandless acid pump and the largest standard axial flow fan.

Pipes and fittings and propeller-type stirrers will also be on display.

**KLINGER, RICHARD, Ltd,** **Stand 1 C,**
**Sidcup, Kent** **Grand**

The main exhibit consists of an assembly of Klingermatic remote-controlled piston valves operated by a Lockheed hydraulic control unit. These valves give positive operation in any position and gradual opening or closing if required, and can operate over distances up to 250 ft from the control unit.

Many varieties of compressed asbestos jointings for all pressures and temperatures, and for superheated and saturated steam, chemicals, gases, and hydrocarbons are shown. Also displayed are gaskets, washers, and joints.

There is a range of synthetic rubber mouldings and sheets, extrusions, mouldings, and sheets in silicone rubber, and polytetrafluoroethylene mouldings and sheets.

Other items on show are sleeve-packed cocks for many purposes, including diesel indicators, reflex and double-plate water-level gauges for steam power plants, and for the oil industry at working pressures up to 6000 psi and 1000 psi respectively.

Liquid level gauges and valves are also exhibited.

**LAKE & ELLIOT Ltd,** **Stand 11 D,**
**Braintree, Essex** **Grand**

The main contribution made by this company to the chemical and petroleum industries is the manufacture of furnace fittings under licence from the W-K-M Manufacturing Co. Inc., Key Products Division, Houston, U.S.A. These fittings are made under the trade name Millennium-Key.

These fittings are designed to meet special design conditions

laid down by operating conditions and the materials used are selected to meet these conditions and also the corrosion/erosion characteristics of the raw materials being processed.

The Company also supplies high-quality carbon, alloy and stainless-steel pressure castings, both machined and unmachined, for wellhead, line, relief, safety, control, and regulating valves, pumps, heat exchangers, and tube supports.

The illustration shows the 8⅝-inch-dia. type 8500 return jumps on 30 inch centres to ASTM A 217, Grade C5.

**LANCASTER & TONGE Ltd,** **Stand 14 A,**
**Manchester, 6** **Grand**

The exhibits consist of steam traps for pressures up to 1000 psi, separators, exhaust heads, and vacuum or pumping traps. One pumping trap will be operating with glass observation panels and glass tubing to allow examination of the mechanism whilst in operation.

Part of the stand is devoted to a new development, a range of duplex and large single pipeline strainers, manufactured under licence from Zurn Industrics Inc., Erie, U.S.A. These strainers are particularly suited for use where the flow of a liquid must not be interrupted by the filter.

Two types are shown. A plug-valve type strainer is made in a range of sizes from ¾ inch bore to 4 inches bore, and a gate-valve type in sizes from 6 to 24 inches bore. They are designed to ensure an extremely low pressure drop through the strainer and ease of cleaning is a special feature.

**LANGLEY ALLOYS Ltd,** **Stand 10 J,**
**Langley, Bucks** **Grand**

The Company's activities divide into three broad categories: alloy valves and fittings; stainless steels and nickel alloys; and bronzes.

A wide range of valves are in production from ¼ inch bore to 10 inch diameter. Materials used include aluminium bronze, stainless steel, nickel-base alloys, Monel, and nickel.

Recently introduced is a range of stainless-steel valves the to Continental DIN Standard.

Of special note are the Langalloy R series of special nickel/chrome/molybdenum alloys which offer some of the most outstanding properties in corrosion resistance in metallic materials. Langalloy 20V, a high alloy austenitic steel, bridges the gap between molybdenum-bearing austenitic stainless steels and the special nickel-based alloys.

The Hidurax aluminium bronzes combine high mechanical strength with excellent corrosion resistance.

**LE GRAND (Rochester) Ltd,** **Stand 6 C,**
**Rochester, Kent** **Grand**

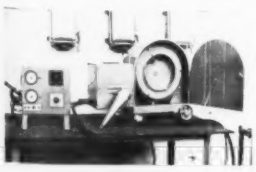
The main theme is oilfield equipment with special emphasis on pumping units, wellhead equipment, and cementing equipment.

Included is an L 10 pumping unit complete; a wellhead and Christmas tree. Of particular interest is a working scale-model of a pumping unit. Through this spectators can see oil actually being pumped from the producing horizon and arriving at the surface.

Also on view will be ancillary equipment such as stuffing boxes, polished rod clamps, and variable chokes. Space is assigned also to a range of samples of Halliburton floating equipment, manufactured under licence. The Company's most recent association is with the Davey Compressor Co., whose products are illustrated by photographs.

For the first time in Britain a range of Camco gas-lift equipment, as manufactured by Camco Inc. of Houston, Texas, is shown and this has been brought over specially from America.

**LINCOLN ELECTRIC Co. Ltd,** **Stand 2 A,**
**Welwyn Garden City, Herts** **Grand**



The main feature on the stand is a replica of a refinery pipeline installation. Continuous demonstrations will be given of the Lincoln stove-pipe welding technique using Fleetweld 5 and Shield-Arc 85 electrodes. The full range of Lincoln electrodes will also be shown.

There will also be demonstrations of the Arcair cutting and gouging process, the M.L.2. manual Lincolnweld, and the latest B.11 fully automatic submerged arc welding unit, with travel carriage mounted on a column and beam. The M.L.2 semi-automatic welder with remote control unit is shown in the illustration.

Current for the Arcair and pipe-welding demonstrations will be supplied from a Lincoln SAE 300 motor generator fitted with a new remote control enabling the current to be infinitely varied away from the job.

Powering the M.L.2. manual submerged arc welder will be an SAE 900 motor generator and, using a new remote control unit designed to operate with the M.L.2, pipe sections will be automatically welded.

A feature of the fully automatic Lincolnweld is the powering of the unit with the new Lincoln C.V. 750 constant-voltage generator. The equipment will demonstrate the submerged arc automatic welding of pressure vessels for the petroleum and chemical industries.

The Lincoln SAE 300 diesel engine-driven unit is shown, together with a complete range of welding accessories including the new fully insulated Jackson electrode holders.

**LIQUID SYSTEMS Ltd,** **Stand 10 inner,**
**Croydon, Surrey** **Grand gallery**

A comprehensive range of Schlegel re-refining systems for the reclamation of waste products will be shown and demonstrated. They are either batch or continuous process regenerators, which combine distillation, adsorption, and filtration, working on a physical-chemical principle and can be equally well used for regeneration of all types of oil, petrol, turpentine, kerosine, nitrosolvents, trichlorethylene, etc.

Operation is safe and they can be used by an unskilled worker after very short training.

Depending on the amount of dirt in the waste oil, Schlegel will yield up to 95 per cent of regenerated oil.

Batch processing models have capacities ranging from 3·3 to 88 gallons.

A full range of Liquid Systems' latest sight flow indicators will also be on view together with photographs of some of the large variety of installations executed by the Company.

**LONDEX Ltd,** **Stand 20 outer,**
**Anerley Road, London, S.E.20** **National gallery**

**LONDON ALUMINIUM Co. Ltd, THE,** **Stand 9 F,**
**Witton, Birmingham, 6** **Grand**

**LONDON & MIDLAND STEEL** **Stand 1 D,**
**SCAFFOLDING Co.,** **Grand**
**Lygon Place, London, S.W.1**

**L. P. GAS EQUIPMENT Ltd,** **Stand 32 inner,**
**Birmingham, 11** **Grand gallery**

**MACK TRUCKS (Britain) Ltd,** **Stand 7 J,**
**Barking, Essex** **Grand**

**MANESTY MACHINES Ltd,** **Stand 12 G,**
**Speke, Liverpool, 19** **Grand**

Extensively employed in the production of catalysts, the firm's tablet-making machines, examples of which are on display, can produce up to 110,000 tablets per hour.

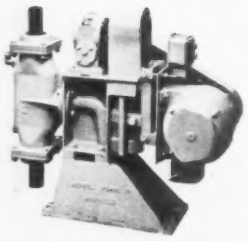
Automatic water stills, as used in many laboratories of petroleum refineries, are available heated by gas, kerosene, electricity, or steam.

A selection of punches and dies in steel and phosphor bronze, some with tungsten carbide insets, completes the exhibits.

**MARSHALL SONS & Co. Ltd,** **Stand 6 G,**
**Gainsborough** **Grand**

**MARSTON EXCELSIOR Ltd,** **Stand 9 G,**
**(See Imperial Chemical Industries Ltd)** **Grand**

**MERRILL PUMPS Ltd,** **Stand 3 A,**
**Cavendish Road, Sheffield, 11** **Grand**



There is a large display of glandless, self-priming, diaphragm pumps with contacting parts of chemical rubber, neoprene, chlorosulphonated polyethylene, ebonite, polythene, porcelain, stainless steel, PVC, etc.

Sleeve valves are shown with fixed and loose sleeves, for handling air, gas, water, and chemical services. These valves have the virtues of both lubricated plug cocks, and conventional diaphragm valves, but the disadvantages of neither.

Other exhibits are:—

Pressure relief valves for dealing with corrosive gases and liquids.

Auxiliary equipment—suction strainer boxes, holding-up valves, mobile descaling units, air-cushioning vessels, etc.

A.C.P. Rodines for inhibiting sulphuric acid, hydrochloric acid, hydrofluoric acid, phosphoric acid, etc., used in metal pickling processes.

A.C.P. Rodines for inhibiting hydrochloric acid used in chemical descaling processes.

A.C.P. Rodines for inhibiting hydrochloric acid used for oil-well rejuvenation.

The 12 gpm acid pump is shown in our illustration.

**METADUCTS Ltd,** **Stand 12 inner,**
**Brentford, Middx** **National gallery**

The company is showing for the first time a range of Metamix mixers.

**METAL CONTAINERS Ltd,** **Stand 5 Q,**
**Waterloo Place, London, S.W.1** **National**

**METAL PROPELLERS Ltd,** **Stand 11 C,**
**Croydon, Surrey** **Grand**

Exhibits include photographs of complete plants recently engineered and manufactured from flow data by the Company, columns and vessels, tower internals, heat exchangers, strip lining, and reaction vessels.

The 6-ft dia. stainless-steel column shown is one of number for export. Other photographs show the three main stainless-steel distillation columns of Chemstrand Ltd's new Acrylic fibre plant in Northern Ireland.

A 10-ft dia. Glitsch bubble tray for Trinidad and a 3-ft dia. Turbogrid tray in Corronel B are shown.

Jacketed reaction vessels include those of 50, 190, and 350 gallon capacity in stainless steel and nickel.

**METERING PUMPS Ltd,** **Stand 17 A,**
**Ealing, London, W.5** **Grand**

**METROPOLITAN-VICKERS** **Stand 7 N,**
**ELECTRICAL Ltd** **National**
**Manchester, 17**

The Newton-Victor Raymax 60 industrial X-ray diffraction unit is on view, together with a representative range of flameproof squirrel-cage electric motors with power outputs of from 10 to 400 hp.

A small 3 hp motor is shown coupled to a type 1 0 AS Rotork valve actuator and there is a geared motor unit, which comprises a ½ hp squirrel-cage motor and Metropolitan-Vickers gear box.

A model is shown of barge GP 10 for oil-drilling operations on Lake Maracaibo. This barge is fitted with automatic selection of electrical operating equipment.

**MEYNELL & SONS Ltd,** **Stand 38 outer,**
**Wolverhampton** **Grand gallery**

Exhibits include a complete range of gunmetal valves, plug cocks, etc., and a wide range of specialized fittings.

A steam/water mixing valve is shown for the first time and has the advantages of comparatively noiseless running and relatively low cost. Installation and maintenance costs are also less as no reducing valves or check valves are used. The valve will operate on inlet service pressures up to 150 psi steam and 5 psi water.

The Rayon-patent stop valve is a new valve of advanced design for controlling the flow of almost any fluid and gas up to a maximum temperature of 100 C. The valve is suitable for acids, corrosive fluids, and brine and for use in absolute vacuum. The development of a nylon clack makes the valve specially applicable to the control of petrol, oils, solvents, and many materials that have previously had a severe effect on rubber or synthetic rubber. The nylon clack can also be used for certain hot-water applications and obviates packing glands or stuffing boxes.

Also shown for the first time is a range of union bonnet valves for the chemical industry.

**MIRRLEES WATSON Co. Ltd, THE,** **Stand 4 H,**
**Glasgow, C.5** **Grand**

**MISSION MANUFACTURING Co. Ltd,** **Stand 25 inner,**
**Hanover Square, London, W.1** **Grand gallery**

This Company is affiliated with the Mission Manufacturing Co. of Houston, Texas. The following products are now being manufactured in the Company's Belfast works and representative examples will be on show.

Piston rubbers for slush pumps and pistons, super-chrome piston rods with two wearing surfaces, and gland packing elements are produced by the firm. The Mud Monarch slush pump valves are geared for the high pump pressures encountered in modern drilling and the silver-top slush pump valves are characterized by replaceable bushings which increase valve seat life. The E-Z swabs automatically by-pass fluid overloads.

Other products include Super Service liner packing, valve seat pullers, and valve springs.

**MITCHELL, L. A. Ltd,** **Stand 8 C,**
**Manchester, 2** **Grand**

This firm covers the major fields of industrial drying, liquid mixing, corrosive liquid pumping, and chemical process equipment.

The driers are extensively used for drying petroleum chemical products of a solid nature either in intermittent drying stoves and cabinets or continuously in a variety of designs suited to the material.

The Company's liquid mixers are standard equipment in many refineries for large-scale blending operations and special designs of turbo and other types of impeller heads are available for reaction vessels, chemical treatment process tanks, etc.

The Mitchell centrifugal pumps are manufactured in corrosion-resisting corundum body and also have a high resistance to thermal shock.

Other products include grease kettles, esterification reaction kettles, air flotation effluent treatment plants, and bulk storage installations for chemical liquids and solutions.

**MOND NICKEL Co. Ltd,** **Stand 2 C,**
**Millbank, London, S.W.1** **Grand**

**MONO PUMPS Ltd,** **Stands 1 Q and**
**Sekforde Street, London, E.C.1** **1 R, National**

**MORITZ CHEMICAL** **Stand 15 inner,**
**ENGINEERING Co. Ltd,** **National gallery**
**Earls Court Road, London, S.W.5**

**MUNRO & MILLER Ltd,** **Stand 9 outer,**
**Edinburgh, 11** **Grand gallery**

**MUREX Ltd,** **Stand 9 P,**
**Rainham, Essex** **National**

Articles fabricated in pure tungsten, molybdenum, tantalum, niobium, and zirconium are on show. They include tantalum bayonet heaters for the petroleum industry and tantalum absorption columns for hydrochloric acid.

A high-temperature vacuum furnace with tungsten heater element and molybdenum radiation screens is being demonstrated.

Notable among other exhibits are niobium tube, sheet and wire, crucibles in pure tungsten, sintered permanent magnets, and a selective range of cemented tungsten carbide tools, tips, dies, and wear-resisting parts.

**MUREX WELDING PROCESSES Ltd,** **Stand 8 J,**
**Waltham Cross, Herts** **Grand**

**NATIONAL PROVINCIAL BANK Ltd,** **Stand 8 outer,**
**London, E.C.2** **National gallery**

**NATIONAL STEEL FOUNDRY,** **Stand 11 D,**
**(See W.K.M. Valve Co.)** **Grand**

**NEGRETTI & ZAMBRA Ltd,** **Stand 10 H,**
**Regent Street, London, W.1** **Grand**

**NEWALLS INSULATION Co. Ltd,** **Stand 6 P,**
**Washington, Co. Durham** **National**

**NEWMAN, HENDER & Co. Ltd,** **Stand 8 B,**
**Woodchester, Glos** **Grand**

A selection of valves and fittings is shown. These include bronze gate, globe and check, cast-iron and cast-steel gate valves, forged-steel valves, and fittings.

Exhibits of special interest to the petroleum industry are Christmas tree assemblies and Newman-McEvoy automatic self-sealing conduit gate valves for production and pipeline services. An electrically operated example of the latter is featured.

A range of cast-iron and cast-steel Newman-Milliken lubricated parallel plug valves includes pipeline types and patterns having pneumatic, hydraulic, and gear operation, in addition to the normal wrench-operated valves.

**NEWTON, CHAMBERS & Co. Ltd,** **Stand 7 P,**
**Sheffield** **National**

**NORDAC Ltd,** **Stand 5a M,**
**Uxbridge, Middx** **National**

**NORTH BRITISH RUBBER Co. Ltd,** **Stand 13 inner,**
**(See U.S. Rubber International (GB) Ltd)** **Grand gallery**

**NORTHERN ALUMINIUM Co. Ltd,** **Stand 5 outer,**
**Banbury, Oxon** **National gallery**

**THE OIL WELL ENGINEERING Co. Ltd,** **Stand 7 C,**
**Stockport** **Grand**

The exhibit, in the main, comprises surface machinery for drilling to depths up to 12,000 ft. Individual items of equipment include the following. A rotary drawworks rated for a power input of 1000 hp, with overrunning clutch and Hydromatic brake. A slush pump, of input rating 700 hp, for pressures up to 3000 psi. A three-engine drive to the drawworks and slush pump. A rotary table driven from the drawworks and a rotary swivel with a dead load capacity of 800,000 lb. All this equipment will be running at suitable intervals.

Scale models will include trailer-mounted drawworks with a 100-ft telescopic mast, the Parkersburg single rotor Hydromatic brake, a National rotary swivel, Baker floating and cementing equipment, and cut-away Spang double-seal shrink-thread rotary tool joint.

In addition there will be Chiksan high-pressure swivel joints, covering the full range of types and styles. Chiksan cementing hose and models of Chiksan loading arms and marine loading arms will also be displayed.

The stand is presented in collaboration with Davey, Paxman & Co. Ltd, of Colchester.

**OIL WELL SUPPLY Co. Ltd,** **Stand 10 O,**
**Gateshead, 8** **National**

Oilwell-Britain equipment, made in the U.K. by Armstrong Whitworth (Metal Industries) Ltd, Gateshead, to designs of the Oil Well Supply Division of the United States Steel Corporation, is shown. The equipment is identical to, and interchangeable with, the American-made range.

Pumps on display include a double-acting crank-type piston pump for mud service in medium depth drilling with a working discharge pressure of 1800 psi, an eccentric-driven double-acting duplex piston pump for slush service on portable rigs, a double-acting duplex pump for mud, water, oil, and similar liquids, and an eccentric-driven double-acting duplex pump with a permitted working pressure of 1000 psi.

Other exhibits are a swivel with an API rating of 300 tons recommended for drilling with 4½-inch 16·60 lb/ft drill pipe to a depth of 18,000 ft at 100 rpm, 14,900 ft at 200 rpm, and 12,100 ft at 400 rpm.

A rotary is shown with a deadload capacity of 350 tons, a maximum recommended table speed of 500 rpm, and a maximum table opening of 26 inches.

A range of tool joints, manufactured by Armstong Whitworth (Metal Industries) Ltd under licence from the Reed Roller Bit Co., Houston, Texas, is shown. They include the 2⅞-inch, 3½-inch, 4½-inch internal flush, and 4½-inch full-hole types.

**OSBORN, SAMUEL & Co. Ltd,** **Stand 2 inner,**
**Sheffield, 3** **Grand gallery**

**PASCALL ENGINEERING Co. Ltd, THE,** **Stand 1 O,**
**Crawley, Sussex** **National**

**PASS, E. & Co. Ltd,** **Stand 6 L,**
**Denton, Lancs** **National**

**PEABODY Ltd,** **Stand 30 inner,**
**London, S.W.1** **Grand gallery**

**PERKINS, F. Ltd,** **Stand 6 B,**
**Peterborough** **Grand**

**PETBOW Ltd,** **Stand 7 B,**
**Sandwich, Kent** **Grand**

An Olympus 300 kVA diesel generating set is shown. It is one of a new range of mobile sets incorporating a 12-cylinder Ruston Paxman Type RPH engine. A feature is that the main frame is fabricated from steel tubing which acts as fuel tanks with a capacity giving approximately 8 hours running on full load. Filler and drain plugs, a dipstick level indicator, and an engine-driven fuel lift pump are fitted.

A Vulcan 200 kVA skid-mounted mobile diesel generating set is powered by a Rolls-Royce 8-cylinder supercharged engine. This type of set is in operation throughout the world with leading oil companies and contractors and the installed power now exceeds 30,000 kVA.

A Crusader 50 kVA trailer-mounted mobile diesel generating set is powered by a Dorman 4-cylinder engine, and is designed for motor towing over rough ground.

A Chieftain 300 A skid-mounted diesel-driven arc-welding plant is a new lightweight welder powered by a Petter PC4 air-cooled engine.

**PETROCARBON DEVELOPMENTS Ltd,** **Stand 8 O,**
**Manchester** **National**

Scale models and photographs of chemical process plants designed and erected by the Company in Britain and overseas are shown.

Of particular interest is a model of a plant for the production of heavy water by distillation of hydrogen which has been developed in close co-operation with the U.K. Atomic Energy Research Establishment at Harwell. It is based on theoretical, laboratory, and pilot-plant work carried out at university laboratories and at Harwell for many years, particularly on the problem of obtaining a high-purity feed gas by freezing out impurities in reversing heat exchangers and regenerators. Refrigeration is produced by expansion turbines and low pressures below 10 atm are used. Simon-Carves Ltd, of Stockport, are the engineering contractors for this Petrocarbon-designed plant.

Other scale models and flowsheets cover plants for a wide range of chemicals and involving many specialized unit operations. These include plants for the production of *iso*propanol, polystyrene, formaldehyde, ethanolamines, propylene oxide and glycols, ethylene oxide, and glycols, evaporation plants for thermosensitive materials, and plants for the production of argon.

**PETROLEUM EQUIPMENT Co. Ltd, THE,** **Stand 24 inner,**
**Hinchley Wood, Surrey** **Grand gallery**

**POWELL DUFFRYN Ltd,** **Stand 3 O,**
**Great Tower Street, London, E.C.3** **National**

**POWER-GAS CORPORATION Ltd.** — **Stand 3 K, Grand**
**Stockton-on-Tees**

Of particular interest is the Braun heat exchanger, which is 21 ft long and 4 ft in diameter. There are also working models of an industrial crystallation plant and of a Wiggins dry seal gasholder. Both these models are shown for the first time.

**PREMIER COLLOID MILLS Ltd.** — **Stand 4 C, Grand**
**Walton-on-Thames**

Amongst the range of equipment shown are the new 3-inch and 6-inch dispersion mills, which are used in many industries where dispersion and fine grinding are required.

**PRESS, WILLIAM & SON Ltd.** — **Stand 15 outer, Grand gallery**
**(See General Descaling Co. Ltd)**

**PRODORITE Ltd.** — **Stand 11 E, Grand**
**Wednesbury, Staffs**

**PULSOMETER ENGINEERING Co. Ltd.** — **Stand 8 outer, Grand gallery**
**Reading, Berks**

Examples from an extensive range of pumps are shown. The range includes centrifugal pumps for handling almost all liquids at all temperatures and pressures with working heads up to 8500 ft. Both single and multi-stage pumps, together with the Pulso-meter-Pacific designs, are on display.

There is a model of water-treatment plant in which the Company specializes and specimens of high vacuum pumps.

Subsidiary Companies also show their products on this stand. Joseph Evans & Sons (Wolverhampton) Ltd display a high-pressure cleaning unit, which has many industrial uses and has attachments for cleaning pipes and tubes. Hydraulic jacking equipment suitable for refinery construction work is shown by Skihi Ltd, of Isleworth.

**PYRENE Co. Ltd.** — **Stand 18 outer,**
**9 Grosvenor Gardens, London, S.W. 1** — **Grand gallery**

Fire-protection equipment, consisting of fixed and mobile installations, is shown in the form of actual appliances, models, and photographs. Mechanical foam tenders, trailer units, dry chemical trolley units, and self-contained chemical and mechanical foam engines of 30 gallons capacity are available.

The latest portable foam unit for oil-tank farms is a telescopic foam tower automatically elevated by foam pressure and which has a reach of 70 ft.

Other items are fixed foam risers, vapour seal boxes, and various types of foam inductors and proportionators. There are also complete $CO_2$ installations for specific risks for refineries and chemical works. These installations can incorporate fire-detection systems and automatic operation, if required.

**QUASI-ARC Ltd.** — **Stand 9 E, Grand**
**Bilston, Staffordshire**

Quasi-Arc exhibit electrodes and equipment covering the full range of arc-welding processes.

On the manual welding side, electrodes chosen for demonstration are of particular interest to the oil and chemical industries. These are:

*Celtian*, a cellulose iron powder electrode developed for welding pipelines and storage tanks by the "stovepipe" method.

*Ferromax*, a new low hydrogen rutile iron-powder type of electrode which gives high deposition rates at high currents, combined with weld metal of high metallurgical quality, in all positions.

*Mirrospeed*, a new electrode specially designed for easy deposition of horizontal-vertical fillet welds.

*Chromoid* No. 5, a 25 20 Ni-Cr electrode, extensively used for joints between dissimilar metals, developed especially to give freedom from hot fissuring.

*Vordian* and *Vertispeed*—two electrodes particularly suitable for vertical and circumferential joints in storage tank construction.

A new range of motor generators and diesel-driven generators, all suitable for depositing cellulose covered electrodes frequently used in positional pipe welding is shown.

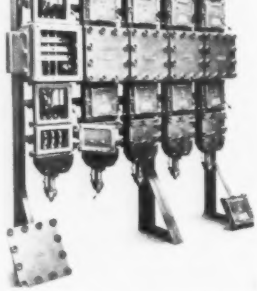
A range of rectifier equipment now extends from 200 A to 1200 A sets. Also on show will be a.c. transformer equipment ranging from 200 A single operator sets to multi-operator plant supplying six operators with 450 amps. each.

The new Lynx equipment for the shielded inert gas metal arc welding on non-ferrous alloys, corrosion— and heat-resisting steels and mild steel will be demonstrated.

Unionmelt, Fusarc, and the new Fusarc $CO_2$ open-arc automatic welding process which is the subject of pending patent applications will be on display, and a new machine for automatic welding of lap joints of oil storage tank bottoms and roofs by the Fusarc $CO_2$ process will be demonstrated. Automatic welding installations are also on display.

**Q.V.F. Ltd.** — **Stand 7 Q, National**
**Stone, Staffs**

**REYROLLE, A. & Co. Ltd.** — **Stand 2 Q, National**
**Hebburn, Co. Durham**



Exhibits comprise industrial and flameproof switchgear up to 11 kV, the largest unit on view being a 350-MVA horizontal-draw-out metalclad panel. Also shown is a two-panel four-circuit 80 A 550 V contactor switchboard of flameproof construction with a remote-control pedestal for plant in oil refineries and chemical factories.

A double-circuit flameproof 10-A contactor is shown coupled to a busbar run of flameproof switch-and-fuse distribution board comprising units of 60,100, and 200 A rating. A non-flameproof version of this gear is also displayed.

A two-panel 3300-V flameproof switchboard comprising 200-A and 400-A metalclad pillar units with horizontal-draw-out oil-break circuit breakers is on the stand. A representative selection of industrial and flameproof plugs and sockets completes the display.

**RHODES, B. & SON Ltd.** — **Stand 30 outer,**
**Romford, Essex** — **Grand gallery**

**RHODES, BRYDON & YOUATT Ltd.** — **Stand 4 J, Grand**
**Stockport**

**RICHARDS, CHARLES & SONS Ltd.** — **Stand 29 outer, Grand gallery**
**Darlaston, Staffs**

**RILEY, A. J. & SON Ltd.** — **Stand 10 D, Grand**
**Batley, Yorks**

**ROLLS-ROYCE Ltd.** — **Stand 2 D, Grand**
**Derby**

**ROSE, DOWNS & THOMPSON Ltd.** — **Stand 3 K, Grand**
**Hull (See Power-Gas Corporation Ltd)**

**RUSSELL CONSTRUCTIONS Ltd.** — **Stand 3 inner,**
**Adelphi, London, W.C. 2** — **Grand gallery**

Some recent development in sieving and straining equipment are on view. These comprise a high-speed strainer, with a screen area of less than 2½ sq. ft, which can strain materials at an output up to 1200 gallons/hour, and can function with the finest screens.

An improved version of a self-cleaning separator, which automatically rejects oversize material, and has been successfully applied

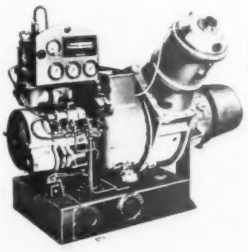
to straining of oil-based mud on drilling rigs, has a capacity up to 15,000 gallons/hour.

A cascade sieving machine, with outputs up to 6 tons/hour, is silent in operation and completely dustproof. Fine nylon mesh is used as the screening element.

At very high speeds of gyration phenomenal outputs can be attained with the sieving and straining processes and a new variable speed unit demonstrates the remarkable effects obtained.

**RUSTON & HORNSBY Ltd,** **Stand 11 A,**
**Lincoln** **Grand**

The Company is displaying its 750–1000 kW gas turbine, which was introduced in 1951. This machine was the first industrial gas turbine to be built in quantity outside the U.S.A. and is recognized on oilfields throughout the world as an excellent prime mover for electricity generation and pumping. It is also very suitable for centrifugal compressor drives.



A smaller gas turbine, the mark TE of 430 bhp, is also on show and appears in our illustration. Being a single-shaft machine this turbine possesses exceptional governing characteristics and is designed for heavy duty and long life.

A range of air-cooled diesel engines for all types of portable and semi-portable power plant is also on view.

The largest exhibit on the stand, a 6-cylinder 540 bhp pressure-charged unit, is one of a consignment of 21 similar engines shortly to be delivered to the National Iranian Oil Co. for oil pumping duties on phase II of the Trans-Iranian Pipeline scheme.

**ST HELENS CABLE & RUBBER Co. Ltd,** **Stand 2 R,**
**Slough** **National**

**SANT STURGESS INDUSTRIES Ltd,** **Stand 3 M,**
**Park Royal, London, N.W.10** **National**

**SAUNDERS VALVE Co. Ltd,** **Stand 17 K,**
**Palace Street, London, S.W.1** **Grand**

**SCOTT, GEORGE & SON (London) Ltd,** **Stand 5 L,**
**(See Henry Balfour & Co. Ltd)** **National**

**SERCK RADIATORS Ltd,** **Stand 7 E,**
**Birmingham, 11** **Grand**

A number of primary and secondary surface heat exchangers and oil coolers are shown.

Among the exhibits are primary surface oil coolers and heat exchangers for diesel, petrol, and oil engine jackets, water, and lubricating oil, hydraulic couplings, gearbox oil, chemical and petroleum process plant, for liquid and gas cooling.

A sectional radiator for oil-well drilling package set. The unit shown is a combined oil and water cooler. The radiator surface consists of a number of removable and interchangeable sections which are easily replaced.

A ¼-scale model of the type A heat exchanger is shown.

The Serck-Behr hydrostatic fan drive is well known to railway traction engineers and many units are in service in diesel locomotive installations. A demonstration unit with the drive will be running during the exhibition.

A guided-flow furnace fuel-oil heater is shown.

Serck Tubes Ltd, another member of the Serck group, are showing a range of condenser tubes for heat exchangers, oil, liquid, and gas coolers, evaporators, condensers, and general engineering purposes. Among the materials shown will be cupro-nickel, aluminium brass, 70/30 brass, aluminium bronze, Admiralty brass and aluminium, and bi-metals.

A panel will display tanker heating coils and U-Bends. A large tube bundle for a petroleum refinery heat exchanger will be shown.

**SERCK TUBES Ltd,** **Stand 7 E,**
**(See Serck Radiators Ltd)** **Grand**

**SHARPLES CENTRIFUGES Ltd,** **Stand 9 H,**
**Woodchester, Glos** **Grand**

**SHEEPBRIDGE ENGINEERING Ltd,** **Stand 1 H,**
**Chesterfield** **Grand**

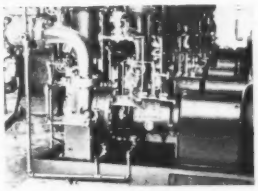
**SIEBE, GORMAN & Co. Ltd,** **Stand 5 K,**
**Chessington, Surrey** **Grand**

Various forms of breathing apparatus, including a compressor set for 6 men for cleaning tanks, etc., are shown and two versions of the self-contained compressed air apparatus as supplied to the leading petroleum companies.

Protective clothing for chemical workers including ethyl blending will be shown, and a range of gas and dust respirators. Gas-detection equipment, safety helmets, goggles, gloves, and fresh air breathing apparatus fitted with the new full-vision vista mask will also be included in the exhibits.

The new vista mask, which is now in production, is capable of being used with either compressed air, bellows, blower, or direct to air. It gives a wide field of vision, has a gas-tight facepiece, and can be tested before entry into a toxic atmosphere.

**SIGMUND PUMPS Ltd,** **Stand 6 A,**
**Gateshead, 11** **Grand**



An excellent example of standardization in manufacture for a wide range of applications in the chemical industry is the B-N stainless-steel chemical plant which can operate at temperatures up to 250 °F (120 °C) without special cooling arrangements. The range covers outputs up to 250 gpm, and heads up to 350 ft.

The A-N heavy-duty chemical pump, for outputs up to 1200 gpm and heads up to 300 ft, can be operated at temperatures up to 365 °F (185 °C). A feature is the liquid thrower which facilitates removal of the impellers and shaft sleeves without the use of a special tool.

The WA-N range of glandless acid pumps can handle sulphuric acid, oleum, and similar chemicals and can be submerged in the liquid or fixed on the side of tanks. The flooded suction then obtained avoids the priming difficulties associated with the horizontal chemical pump. Range covers heads up to 115 ft and outputs up to 1500 gpm.

The HO-N pumps are single-stage single-suction high-temperature pumps designed for the maximum duties required of process pumps. A group of these pumps is shown in the illustration.

Sectional illustrations of two-stage and multi-stage pumps, and photographs of installations in refineries in Britain and abroad are also displayed on the stand.

**SILVERSON MACHINES (Sales) Ltd,** **Stand 27 outer,**
**Tower Bridge Road, London, S.E.1** **Grand gallery**

An entirely new immersion-type ball mill is shown. This machine is completely different from the orthodox ball or roller mill. Its working principle is that the materials are sucked into a working track and all powders and pigments are ground to a fine impalpable texture by a number of stainless-steel balls. It is claimed to reduce manufacturing time by 20 per cent.

**SIMMONDS AEROCESSORIES Ltd,** **Stand 31 outer,**
**Treforest, Glamorgan** **Grand gallery**

A wide range of field-handling instruments, valves, nuts, and clips is shown.

There is a direct-reading gauge which operates with no external power, a hydrostatic gauge actuated by compressed air or hand pump, a hydraulic gauge for all types of fluid, and tanks operating under pressure or vacuum.

The Pacitor electronic gauge is designed for installation where float arm, air, or diaphragm gauges are unsuitable. A liquid level controller is also shown. The latest development in American liquid gauges, the Gilbarco electronic tank gauge, is to be manufactured in Britain under licence and has accuracy to $\frac{1}{16}$ inch in very deep tanks.

Two other instruments are an automatic sampler which extracts a predetermined quantity from a pipeline at regular intervals and an electric contents gauge for use on mobile or static installations.

Fram horizontal and vertical separators for hydrocarbon

liquids are shown, and this type of filter is also demonstrated in action. Fram filters for industrial engines are also displayed.

The stand is completed by Simmonds flow control and excess flow valves which automatically maintain liquid flow at the required rate, a range of Spire nuts, fixes, and clips, and the Nyloc self-locking nuts. A subsidiary of Simmonds Aerocessories Ltd is Firth Cleveland Instruments Ltd.

**SIMMONS & HAWKER Ltd,** **Stand 11 F,**
**Wandsworth, London, S.W.18** **Grand**

**SIMON-CARVES Ltd,** **Stand 7 F,**
**Cheadle Heath, Stockport** **Grand**

The main features of this stand are scale models of a sulphuric acid plant, a tar-distillation plant (designed by a subsidiary company, Chemical Engineering Wiltons Ltd), a nuclear power station, and an electro-precipitator of the type used for collection of pulverized fuel flue dust at power stations.

An array of photographs of plant produced by the firm completes the exhibit.

**SLINGSBY, H. C. Ltd,** **Stand 20 outer**
**Kingsway, London, W.C. 2** **National gallery**

The firm produces a range of drum trucks and stillages and demonstrations of them are being given on the stand.

With the drum trucks the drum or barrel is never touched by hand, which is a safety feature of the first importance. The Slingsby drum stillages, with one interchangeable handle, offer an inexpensive and simple means of raising and storing drums with outlets 17 inches off the floor for instant drawing-off of liquids. The carboy truck permits handling of carboys even when uncapped and the free swinging frame of the truck prevents loss of contents.

**SMITH & NEPHEW Ltd,** **Stand 23 outer,**
**Welwyn Garden City, Herts** **National gallery**

Demonstrated on this stand is Lassorap (formerly known as Lassovic PWG) a PVC self-adhesive anti-corrosion tape. This tape has been used to protect deck pipes on oil tankers and joints on pipelines in oil refineries. Lassorap can be used in conjunction with the cathodic protection installation. Lassorap conforms to irregular surfaces, will withstand rough handling, and variable climatic conditions.

The tape can be applied by hand or by the Rap-O-Pipe machine. This machine will be demonstrated on the stand.

**STABILAG Co. Ltd, THE,** **Stand 8 Q,**
**Hemel Hempstead, Herts** **National**

A pilot-plant gas-purged heater will demonstrate how electric jacketing can be used for heating with complete safety in a fire hazardous area.

A new type of high loading laboratory heating mantle is shown alongside the existing laboratory range.

Rod heaters are displayed on a separate panel, and certain models will be connected to a test panel so that visitors may appreciate the simplicity of connexion and efficiency of the rods in use.

A working model will feature conveyor heaters.

Two types of electric-jacketed heating pans are shown. Mechanically assisted tilting and manual tilting are on display.

A 45-gallon drum heater will illustrate the remarkable economies in time and money effected by their use in emptying viscous contents from drums.

The stand is completed by a range of flexible heating tapes. By using different types, pipeline heating can be carried out from below zero to 1000 C. Viscous materials, even molten metals, can be kept flowing in pipes and water pipes can be protected against freezing by these tapes.

**STEEL EQUIPMENT Co. Ltd, THE,** **Stand 1 G,**
**Greets Green, Staffs** **Grand**

**STEELWAY Ltd,** **Stand 1 outer,**
**(See Hipkiss Bros Ltd)** **Grand gallery**

**STERLING CABLE Co. Ltd, THE,** **Stand 4 outer,**
**Aldermaston, Berks** **National gallery**

**STEWARTS and LLOYDS Ltd,** **Stand 4 F,**
**London, W. 1** **Grand**

Stewarts and Lloyds Ltd, together with two of their subsidiaries, The Victaulic Company Ltd and Tubewrights Limited, are exhibiting their products on this stand.

Two films showing the methods used in the manufacture of seamless steel tubes—the plug mill and rotary forge processes—and illustrating some of the applications these tubes have in the petroleum and chemical industries are being presented. Further illustrations of the uses of Stewarts and Lloyds' products are given by still photographs of casing, tubing and linepipe, butt-welding fittings, and fabricated pipework.

An illuminated world map is on display indicating the international character of Stewarts and Lloyds' sales to the oil industry.

The Victaulic Company Ltd have samples of their joints and couplings on exhibit.

Tubewrights Ltd are showing models of the patented Markussen pallet which they manufacture.

**STOCKDALE ENGINEERING Ltd,** **Stand 12 C,**
**Poynton, Cheshire** **Grand**

**STONE, J. & Co. (Charlton) Ltd,** **Stand 18 inner,**
**London, S.E.18** **National gallery**

**STOTHERT & PITT Ltd,** **Stand 5 M,**
**Bath** **National**

Pumps exhibited include those for fuel and lubricating oil distribution and handling, spirit and road tanker pumps with reversing flow, and a range of centrifugal and variable output fuel oil pumps with pressure control.

The main exhibit of an associated company, Torrance & Sons Ltd, is the recently developed TAP (Torrance automatic process) unit for continuous dispersion and or fine grinding of solid particles in the liquid phase. This is believed to be the first 24-hours-a-day non-attention automatic plant of its kind. A batch-type unit employing the same dispersing principles is also on view.

Other exhibits are examples of more orthodox types of mixing, grinding, and dispersing units, such as roller mills, ball mills, vertical and horizontal paste mixers, and high-speed cavitation dispersers.

**STREAM-LINE FILTERS Ltd,** **Stand 4 Q,**
**(See Vokes Ltd)** **National**

This Company is on the same stand as the parent company, Vokes Ltd and Vokes Genspring Ltd and is showing a full range of their pressure and vacuum operated filters including the following.

Special N3 model for the filtration of insulating oil used in X-ray equipment but equally suitable for other oils such as refrigerator oil, vacuum pump oil, etc., where fine filtration and complete de-aeration and dehydration are required.

Pressure-operated filters type P8 and P37 suitable for the filtration of lubricating oil, edible oil, disinfectants, etc.

A model PM55A filter primarily designed for the filtration of aviation fuel but equally suitable for dealing with solvents and similar liquids.

Model O8L vacuum-operated self-contained filter suitable for lubricating oil, cutting oil, hydraulic oil, etc.

They are hoping to be able to show the latest small pilot filter in addition to their small scale laboratory filters used for exploratory purposes.

**SULZER BROS (London) Ltd,** **Stand 8 H,**
**Bedford Square, London, W.C.1** **Grand**

**TALBOT STEAD TUBE Co. Ltd,** **Stand 7 A,**
**Walsall, Staffs** **Grand**

**TANGYES Ltd,** **Stand 22 outer,**
**Smethwick, Birmingham** **National gallery**

**TAYLOR CONTROLS Ltd,** **Stand 7 H.**
**London, E. 17** **Grand**

The new Transcope recorder is an instrument of the miniature series, with a panel cut-out only 6 × 6 inches. Outstanding among its features are the Servomatic power pens which are claimed to have 150 times the power of the conventional type.

Another new model is the potentiometer transmitter which represents a unique conception in a bridge balancing potentiometer. It embodies an electronic circuit which eliminates the need for a slidewire, battery, standard cell, or moving parts.

In conjunction with the Transcope recorder, there is the Transcope controller, which is a non-indicating miniature pneumatic instrument, characterized by easy maintenance, negligible drift, and ease of change of control form.

**TAYLOR RUSTLESS FITTINGS Co. Ltd, THE,** **Stand 12 F,**
**Leeds, 12** **Grand**

As specialists in the manufacture of plant and equipment in stainless steel all the Company's exhibits are in this metal and range in size from a 20-ft long tank for a railway wagon and a 14-ft high severe-duty reaction vessel to 5-litre laboratory fermenters and laboratory beakers.

Other exhibits are examples of chemical plant items, such as bubble caps and trays and columns. Fabricated and manipulated pipework is shown from the range of jacketed pans and items of stainless steel chemical holloware and drums are included.

The severe-duty vessel is fabricated entirely in the Company's own workshops and has a polished crevice-free interior.

**TEMPLE PRESS Ltd,** **Stand 23 outer,**
**London, E.C.1** **Grand gallery**

**THERMAL SYNDICATE Ltd, THE,** **Stand 16 inner,**
**Wallsend** **National gallery**

**THERMO-PLASTICS Ltd,** **Stand 26 outer,**
**Dunstable, Beds** **National gallery**

**THOMPSON BROS (Bilston) Ltd,** **Stand 6 H,**
**Bilston** **Grand**

**THOMPSON, JOHN Ltd,** **Stand 2 F,**
**Wolverhampton** **Grand**

**TILGHMAN'S Ltd,** **Stand 15 A,**
**Altrincham, Cheshire** **Grand**

**TIRFOR Ltd,** **Stand 42 outer,**
**Sheffield, 10** **Grand gallery**

**TORRANCE & SON Ltd,** **Stand 5 M,**
**Bitton, Nr Bristol (See Stothert & Pitt Ltd)** **National**

**TOTHILL PRESS Ltd,** **Stand 8 inner,**
**Tothill Street, London, S.W.1** **Grand gallery**

**TOWLER & SON Ltd,** **Stand 2 B,**
**Stratford, London, E.15** **Grand**

**TRENT VALVE Co. Ltd, THE,** **Stand 8 D,**
**London, E.C. 2** **Grand**

This features the 16-inch weir cast-steel wedge gate valve to BS 1414, API 600 3rd edition, 1955, or SOD 224. It has a specially deep stuffing box, which allows for leak-off plug and lantern ring to be fitted if required. The valve has Stellite seats and wedge faces and 13 per cent chrome back seat bush. It is operated by a Rotork type 100 A.S. actuator with flameproof protection, suitable for 400–440 V mains and fitted with a Brockhouse wall-mounting starter, reversing contactor type, with isolator and remote-control switch with drip-proof protection only.

Also shown is a representative selection of valves for steam, water, oil, and chemical plants in cast steel, stainless steel, cast iron, and gunmetal. Exhibits include also pressure gauges and boiler mountings.

**TRIANGLE VALVE Co. Ltd,** **Stand 12 D,**
**Wigan, Lancs** **Grand**

A feature of the stand is a working model of a 4-inch refinery wedge gate valve fitted with Rotork electric actuator. The Perspex windows in the body walls of the valve allow the internal moving parts to be seen, and coloured fluid will be passed through so that the behaviour of the fluid can be studied during opening and closing.

Other items include drop-forged and cast-steel valves in a wide range of sizes from ⅜ to 12 inches. Wedge-gate, globe, and needle valves for use in refineries, conduit-gate valves for oilfield and wellhead service, and the new line blind valves are on display. The new line blind valve improves on previous methods of oilpipe blinding. It disposes of the need for jacks, wheel-keys, tommy bars, and other special tools when closing the blind and eliminates the need to spread lines when changing over.

**TRUNDELL, JOHN & PARTNERS Ltd,** **Stand 6 inner,**
**Temple Avenue, London, E.C.4** **Grand gallery**

**TURNER BROS, ASBESTOS Co. Ltd,** **Stand 5 outer,**
**Rochdale** **Grand gallery**

**U.S. RUBBER INTERNATIONAL (G.B.) Ltd,** **Stand 13 inner,**
**Horseferry Road, London, S.W.1** **Grand gallery**

On show is the latest addition to the Amazon range of hose, the Amazon 2323, a flexible submarine hose. Also shown is a model of the Amazon hose rig.

**UNITED STEEL COMPANIES Ltd, THE,** **Stand 4 N,**
**Sheffield, 10** **National**

Founder members of CBMPE, this Company is showing typical examples of steel products for the chemical and petroleum industries.

Silver Fox stainless steel is represented in a variety of applications, including a half-coil jacketed vessel, a miniature Rosenblad heat exchanger, and a calandria. Samuel Fox & Co. Ltd, a United Steel subsidiary, have pioneered the development in Britain of stainless steel curtain walling, and one entire wall of the stand is constructed of this material. A display of stainless-steel chain-link fencing stresses its advantage over conventional fencing in dealing with corrosion problems.

Forged-steel rings, made by the Company's Steel, Peech and Tozer branch, are shown, together with a forged tube round as supplied to the tube makers for manufacture of cracker tubes for oil refineries. The products are supplemented by photographs which also portray the application of large steel plates in chemical and petroleum plants.

Weight-saving Castella steel beams are incorporated in the stand construction and the recently-developed high-strength torque bolts are also featured.

An interesting example of the Company's research work is a flow diagram of fuel and air in an open hearth furnace, the first furnace to be constructed on the basis of many years of aerodynamic study conducted by the Company's research and development department.

Examples of permanent way materials suitable for private rail tracks and sidings complete the display.

**VACU-BLAST Ltd,** **Stand 8 M,**
**Slough, Bucks** **National**

**VERSIL Ltd,** **Stand 9 B,**
**Liversedge, Yorkshire** **Grand**

A comprehensive range of glass fibre thermal insulations designed for oil refinery application and the efficient conservation of fuel are shown, together with modern engineering constructions for insulation of nuclear and steam power plants and industrial installations, with examples of special finishes for every type of service, including the "Corrugated-Construction" method of insulating boilers, cylinders, and tanks.

Of interest to the oil industry are glass felt tissues and pipe wraps and their applications in the field of corrosion prevention with particular reference to their use in the treatment of underground pipelines as a reinforcement to the bituminous or coal-tar enamel coatings. These tissues are also used as a reinforcing base in the manufacture of bituminous outer pipewraps and roofing felts.

In addition are shown Versil replacement type air filter cells for providing clean air and special steel retaining frames, for both front and side withdrawal. A number of other specialities made of glass fibre complete the exhibit.

**VOKES Ltd and VOKES GENSPRING Ltd,** **Stand 4 Q,**
**Guildford, Surrey** **National**

These two Companies show the latest developments in filtration equipment and a comprehensive range of pipe-suspension equipment.

Pipeline filters for removing oil mist, dirt, water, and other impurities from compressed-air lines with an efficiency of 99·9 per cent are shown.

The wide range of air filters includes the latest Absolute type used in the atomic energy, biological, pharmaceutical, and photographic industries. This filter has high dust-retention efficiency with very low flow restriction characteristics. A variant is a high-humidity filter which is completely tropicalized and may be used at 100 per cent humidity, and there is a high-temperature type of fireproof construction for operating temperatures up to 1000 F.

Performance figures for the box-type canister filter give efficiencies of 99·997 per cent while the K 600, Composite, a variant of the standard K 600 Kompak, is ideal as a main intake or extract filter for laboratories.

The Autoroll is an automatic screen-type air filter with high dust-collection and retention characteristics and which is now available with manual operation. The S.C. rotary screen with special type filter element has been developed to meet the need for bulk air filtration, with minimum maintenance and very high dust-holding capacities.

An entirely new feature of oil and fuel filters is the Maxivee filter element which is on view, together with the new top servicing type filters.

Vokes Genspring Ltd feature their new M range constant support hanger which has innumerable applications wherever piping requires careful control of stresses and strains. Variable support hangers are also shown, as is a recent development, the sway brace which prevents sway and controls horizontal vibration in piping systems. The heavy-duty W range of constant-support hangers is featured and illustrations show them in use at Calder Hall and Chapel Cross.

**WALKER, JAMES & Co. Ltd,** **Stand 1 P,**
**Woking, Surrey** **National**

**WALSALL CONDUITS Ltd,** **Stand 12 H,**
**West Bromwich** **Grand**

Prominent on the stand are Buxton certified flameproof equipment for use in hazardous situations.

The other exhibits are composed of "Sparkless" mercury control units, switches, socket outlets, switched-socket outlets, and plugs with capacities from 2 to 60 A, and including ironclad, weatherproof, and dust-tight patterns.

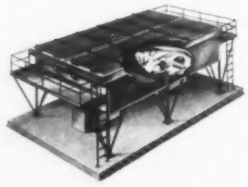
Steel conduit, conduit fittings with attendant accessories, steel cable trunking, and underfloor ducting and trunking with inspection junction boxes are also shown.

A range of industrial lighting fittings completes the display.

**WAYNE TANK & PUMP Co. Ltd,** **Stand 15 outer,**
**Bracknell, Berks** **National gallery**

**WEINREB & RANDALL Ltd,** **Stand 31 outer,**
**Croydon, Surrey** **National gallery**

**WELLINGTON TUBE WORKS Ltd,** **Stand 4 G,**
**Tipton, Staffs** **Grand**



The Company's range of heat-exchange equipment includes the Weldex air-cooled heat exchangers. The example on the stand, and illustrated here, will be installed in an important oil refinery.

Tubular exchangers are also on show and a display of plain and extended surface heat exchange tubes shows the scope of modern developments in this field.

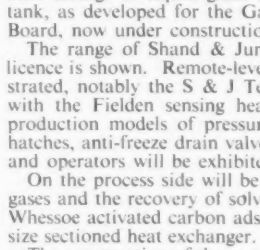
**WESTINGHOUSE BRAKE &** **Stand 9 inner,**
**SIGNAL Co. Ltd,** **Grand gallery**
**Kings Cross, London, N. 1**

The salient feature of the stand is a water-cooled germanium rectifier assembly, part of a 3 MW installation for the generation of chlorine. The water circuit is electrically isolated from the rectifier circuit, thus the water, which is not contaminated, is suitable for other process purposes.

Photographs illustrate rectifier installations, as evidence of the wide applications of the Company's equipment for a.c. to d.c. conversion and of the experience they have gained in the associated control systems.

Battery chargers are shown for all types of battery-driven industrial trucks and delivery vehicles, starter batteries, and telephone-exchange and sub-station float battery systems. Engine starters for petrol and diesel vehicles, cathodic protection rectifier systems for submerged and buried structures, and other rectifiers for the chemical and petroleum industries are pictorially illustrated.

**WHESSOE Ltd,** **Stand 3 E,**
**London, S.W.1** **Grand**



On show are all forms of liquid and gas storage, including low and medium-pressure storage tanks, Horton floating-roof tanks, and other types of evaporation saving devices, and high pressure spheres. A special feature is insulated spheres and tanks recently devised by Whessoe for the low-temperature storage of liquefied gases, the display including a full-scale sphere for the bulk storage of liquid gases and a model of a methane storage tank, as developed for the Gas Council and North Thames Gas Board, now under construction at Canvey.

The range of Shand & Jurs tank fittings manufactured under licence is shown. Remote-level indication systems will be demonstrated, notably the S & J Telepulse system used in conjunction with the Fielden sensing head marketed by Whessoe. Actual production models of pressure and vacuum relief valves, gauge hatches, anti-freeze drain valves, and LPG hydraulic safety valves and operators will be exhibited.

On the process side will be demonstrated the treatment of fuel gases and the recovery of solvents by means of the Carbo-Union-Whessoe activated carbon adsorption plant. There will be a full-size sectioned heat exchanger.

The construction of the reactor pressure vessels for the Bradwell nuclear power station will be illustrated. Linked with this will be a display indicating the development of advanced welding techniques. These have special reference to the site construction of such plant as nuclear reactor pressure vessels employing plate 3 and 4 inches thick. The display will include weld samples of automatic welding developed for large storage tanks and the site welding of thick aluminium plate.

**WICKSTEED, CHARLES & Co. (1920) Ltd,** **Stand 29 inner,**
**Kettering, Northants** **Grand gallery**

Shown for the first time is a tube expander torque control inset, which is suitable for the portable electric drill type motor and has been developed for the controlled expansion of heater and condenser type tubes.

Also on display for the first time is a new type of internal tube cutter which is particularly suitable for small bore tubes in the ⅜ to 1 inch bore range.

**WIGGIN, HENRY & Co. Ltd.,** **Stand 3 C, Grand**
**Millbank, London, S.W.1**

**WILLIAMS, H. & SON Ltd.,** **Stand 28 outer, Grand gallery**
**St Albans, Herts**

**WILSON PIPEFITTINGS Ltd.,** **Stand 10 inner, National gallery**
**Irvine, Ayrshire**

**WINKWORTH MACHINERY Ltd.,** **Stand 2 K, Grand**
**Staines, Middx**

**WINN & COALES Ltd.,** **Stand 13 A, Grand**
**Chapel Road, London, S.E.27**

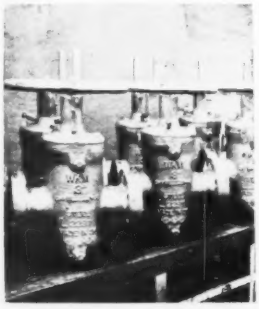
The Company specializes in anti-corrosion products to combat corrosive influences, whether chemical electrolytic, or atmospheric above or below ground, or under water.

Their Denso tapes are used on structural steelwork, steel tanks, and oil pipelines; the Denso compounds, based on inert petrolatum, remain constant in composition. With carriers of cotton, glass, or nylon, they are self-adhesive, effective over a wide temperature range, and easily handled.

A recent development is the lamination of the soft-grease type wrapping with a film of PVC, under the name of Densopol which largely overcomes the limitations of most pressure-sensitive tapes which require a 100 per cent clean dry surface for their application.

Photographs illustrate some of the applications of the tapes and a sectional model shows the ease with which the tapes can be applied to straight pipes by a Denso wrapping machine.

**W. K. M. VALVE Co. (Great Britain) Ltd.,** **Stand 11 D, Grand**
**Regent Street, London, W.1**



Formed in 1953 to promote the manufacture and sale of the W.K.M. valve range in the sterling area, the Company has arranged for the wellhead valves to be made by the National Steel Foundry (1914) Ltd, of Leven, Fife, and pipeline valves from 12 inches upwards by David Brown Industries Ltd.

David Brown Industries Ltd have produced pipeline valves up to 33 inches diameter, but the sales of these valves are handled by the W.K.M. Valve Co. Ltd.

A comprehensive range of valves is shown and there is a Christmas tree of British-made W.K.M. valves erected by Le Grand, Sutcliffe & Gell. Machined valve castings in carbon and alloy steels are also on view.

**WOOD BROS & Co. (Gaskets) Ltd.,** **Stand 19 A, Grand**
**Cleckheaton, Yorks**

**WOODFIELD HOIST & ASSOCIATED INDUSTRIES Ltd.,** **Stands 5 C and 3 D, Grand**
**Rochester, Kent**

Shown for the first time in Britain is the LeBus counterbalance wire line spooling system, which is claimed to have considerable advantages over conventional systems on drilling and production rigs. Also on view is the Woodfield WV 50 chassis, on which the Ideco-Woodfield H-20 is mounted. It is specifically designed for use on drilling production rigs.

**WORTHINGTON-SIMPSON Ltd.,** **Stand 7 O, National**
**Newark-on-Trent**

A selection of chemical, petroleum, and power pumps is shown, together with rotary and Monobloc air compressors.

Of special interest in the chemical field is a new flameproof pump of the patented Monobloc construction. Another new pump for the chemical industry is constructed in Hastelloy B.

A self-priming petroleum pump of 300 gpm capacity, an all-iron Monobloc pump for refrigeration service or handling low viscosity oil, and a self-priming high-head low-capacity pump for boiler feed service are also on display. Maximum capacities of pumps shown are 675 gpm, with heads up to 130 ft.

An oil-cooled rotary air compressor with a displacement of 200 cu. ft/min is shown. The absence of reciprocating parts ensures vibration-free operation and eliminates pressure pulsations. A Monobloc air compressor on the stand is a two-stage unit with a displacement of 36·7 cu ft/min at a pressure of 175 psi.

**WYNN (Valves) Ltd.,** **Stand 12 K, Grand**
**Birmingham, 1**

**YORKSHIRE IMPERIAL METALS Ltd.,** **Stand 5 F, Grand**
**Leeds**

This is the new Company which represents the merging, on an equal partnership basis, of the copper and copper-based alloy tubes, plates, and fittings interests of The Yorkshire Copper Works Ltd and the Metals Division of Imperial Chemical Industries Ltd. Amongst the exhibits are:

Solid drawn tubes for process heat exchangers, coolers, condensers, feed water heaters, fresh water evaporating plant and other tubular heat exchange equipment in a wide range of special non-ferrous alloys to British Standard and ASTM specifications. Alloys include Yorcalbro and Alumbro (alumium-brass), 70/30 cupro-nickel and Kunifer 30, Yorcunife and Kunifer 10, Yorcunife and Kunifer 5 (copper-nickel-iron), and high-tin bronzes, etc.

Heat exchanger end plates and baffle plates, etc., up to the largest sizes, in a wide range of alloys to British Standard and ASTM specifications, including bi-metal plates in combinations of steel and stainless steel and special non-ferrous alloys.

Duplex (bi-metallic) tubes in combinations of steel shirted or lined with one of many non-ferrous alloys, and in combinations of non-ferrous alloys, to meet specific requirements.

Small-bore copper tubes (and applications of cabled copper tubing) and fittings, where applicable, for instrumentation and steam tracer lines, etc.

Tubes and fittings (capillary and compression types) for domestic and general engineering services, refrigeration and air-conditioning plant, etc.

Plastic tubes in standard and natural polythene, "Plastronga" (high strength) polythene, high-impact rigid PVC, clear flexible PVC, rigid PVC and plastic-covered steel and copper tubes; also "Plastronga" polythene fittings for jointing polythene tubing.

Non-ferrous tubing in various alloys for condensers, air and oil coolers, circulating and discharge pipes, calorifiers, fire mains, etc; Yorcalbro & Alumbro (aluminium-brass) tubes and Yorkshire Fittings for cargo heating coils, tubes and fittings for fresh and salt water lines, and general marine engineering services.

**ZWICKY Ltd.,** **Stand 2 S, National**
**Slough, Bucks**

This firm has long been famous for a range of filters for water, oils, and petrol, and the current products are well represented on the stand. Single and dual filters are shown, together with two special types, a self-cleaning filter and a fine particle filter.

A high-pressure fuel pump, specially suitable for starting up oil installations on board ship, meets the requirements of Lloyds and the Board of Trade for use afloat.

Other exhibits comprise pressure controllers and automatic refuelling nozzles.

# *The Organization of Chemical Engineering Projects*

## *The Olympia Symposium*

Coincident with the Chemical and Petroleum Engineering Exhibition a Joint Symposium on the Organization of Chemical Engineering Projects is being held at the Olympia, London, on 24, 25, and 26 June. Organized by The Institution of Chemical Engineers and The Institute of Petroleum, it will also be the 17th Meeting of the European Federation of Chemical Engineering.

The chairman of the first session, which starts at 2 p.m. on 24 June, will be the president of The Institution of Chemical Engineers. At this session two papers will be presented for discussion, as follows:

**The Organization of Chemical Engineering Construction Projects.** By Sir Leonard Owen, C.B.E., and C. J. Turner, C.B.E. (*UKAEA*).

Deals essentially with the provision of new major chemical plants, in which it is necessary to start from first principles, and outlines an organization suitable for execution of such projects in an economical manner and within the shortest practicable period of time. The working of such an organization is illustrated by examples from the chemical plants built at Dounreay to support the operation of the experimental fast breeder reactor. The authors trace the general time pattern of research, design, construction, and commissioning for this scheme and show on a simple chart the functions of the various groups concerned with the work.

Research, flow-sheeting, preliminary design, and selection of process are briefly discussed. Then follows a description of the steps in firm design and construction in which the work of the various specialist groups is co-ordinated by the project engineer.

Emphasis is placed on the value of bar-line programming throughout the work, and on the importance of site selection and layout.

An account is given of the practice followed in the co-ordination of design by means of committees composed of all interested technical and scientific personnel, and of the systematic review of the progress of construction throughout all its phases.

A final section covers cost estimating and control.

**Design Data and Specifications of Requirements Including Site Selection.** By J. P. Asquith, and L. S. Davis. (*W. J. Fraser & Co. Ltd*).

A chemical engineering project is considered from a process engineering contractor's point of view, beginning with the first idea and following the basic steps up to a stage when it is ready for execution.

Throughout, an endeavour is made to deal with basic considerations only—to assure these at each stage and to illustrate them by actual examples.

Four main headings are considered:—

1. *The conception.* Various sources of ideas are given.
2. *The appraisal.* Items that set up the main limitation and boundaries of the project are discussed, and methods of arriving at a set of conditions that make a technically feasible and financially attractive plant are illustrated by examples from the United Kingdom and overseas. The effects of site selection, labour availability, automation, etc., are discussed. The degree of accuracy in estimating procedure required at this stage is stressed.
3. *The development.* The detailed investigation required resulting in a specification of the plant and a feasible programme of the time required, *e.g.*, to meet a market demand for product are next assessed.
4. The complementary parts of client and contractor are examined, both as a separate major factor and in relation to the separate stages with emphasis on how judicious co-operation of this sort can save time and money. Some conclusions drawn as lessons of experience conclude this paper.

For the second session, 10.10 a.m. on 25 June, the chair will be taken by the chairman of the British Chemical Plant Manufacturers Association. Four papers will be read as follows:

**Systems of Project Organization.** By K. M. Curwen, B M.I.Chem.E. (*Albright & Wilson Ltd*).

Project engineering in the chemical industry involves not only the construction of major plants, but also the large number of smaller plants brought into commission every year. A system of project organization operated by a manufacturing company must not only provide for efficient working on major projects where a contractor is normally employed, but the same system must also cater for the smaller plants which are regularly handled entirely by the manufacturing company's engineering division.

This paper will deal largely with experience of three different systems of organization for such smaller projects, and the desirable features of each system will be indicated. Conclusions will be drawn suggesting a satisfactory system of project organization which provides for economy in plant cost, coupled with speed, and at the same time does not cause a skilled project engineer to feel unduly bound in red tape.

A system of feeding information to a project engineer, and from the project engineer to the production department, will be briefly covered, as will the modifications required to this system when using design models for construction.

**A System of Project Organization.** By R. E. Bywater (*Simon-Carves Ltd*).

Written from the point of view of the contractor who has received an order in response to his tender for a chemical plant of his own design to be built in the United Kingdom. It is assumed that foundations and civil engineering design and execution are included in the tender, and the contractor is to supply, erect, and commission a complete plant, including electrical equipment and instrumentation. The tender documents would have included a specification describing the items of equipment, their function, and size or capacity. Terminal points would have been listed, and a schedule of services to be provided by the client appended, stating the quantity and quality of water, steam, compressed air, fuels, and electric power, together with requirements of incoming raw materials.

The paper describes how the contractor organizes his staff to deal with all aspects of the project—planning, design and detailing, purchasing, costing, progressing and inspecting materials, erection and testing, commissioning, and financial settlement.

**Functions of the Contractor.** By L. B. Baker, B.Sc., M.Sc. (*E. B. Badger & Sons Ltd*).

The functions of the contractor are discussed with reference to two extreme cases. First, assistance to a small company in the technical development of a new processing method of its own and in subsequent engineering and construction of the plant and second, the design and construction of a plant for a major processing company.

The steps required to complete the plant are outlined and the contributions of the various departments of the contractor's organization are discussed.

**The Function of the Contractor.** By H. H. M. Jones and W. H. A. Webb (*A.P.V. Co. Ltd*).

The contractor is considered to have been entrusted with the execution of work costing up to about £1 million. The purchaser is considered to be an average sized company for whom such an item of expenditure is a major undertaking at infrequent intervals.

The contract is assumed to be on "turn key" basis. *i.e.*, from commissioning. It is assumed that such a comprehensive responsibility will also cover the less complex case of such assignments where all process details are provided by the purchaser and the contractor performs the detailed engineering, procurement, etc., perhaps leaving plant commissioning, apart from mechanical testing, to the purchaser.

In contracts of this relatively small or intermediate size, the new installation will often be an extension of existing facilities and the contractor will not be called upon to perform the site survey or to provide services and other civil engineering work. The duties of the contractor will be the more onerous, nevertheless within this limited range, because the purchaser will not normally have available staff for collaboration with his own in the elucidation of the many points which will arise.

The steps which must be undertaken by the contractor to carry these functions are described and methods suggested whereby improvements could be made with the co-operation of the purchaser.

The point which is stressed is the relatively high engineering element included in the execution of contracts for plants of small capacity but in which many operations are involved. The difficulties that the contractor has in estimating in advance how his limited facilities can best be deployed are emphasized.

The form of contract which is concluded between the purchaser and the contractor is outlined with variations for different circumstances.

An operational method is advocated whereby the contractor adopts a more positive policy with regard to development of processes. It is suggested that he be engaged in developing his own processes and that he makes use of his specialized knowledge in assisting the development of the chemical manufacturer's processes. Having rationalized the design of the equipment, he is able to provide standardized ideas, possibly even complete units. The advantage of this procedure and the saving in the cost which would be involved are discussed. It is felt that, in this field of chemical plant endeavour, not enough has yet been achieved.

The third session, at 2.15 p.m. on 25 June, will be under the chairmanship of the chairman of the Council of British Manufacturers of Petroleum Equipment, and the following three papers will be read:

**Programming and Progressing Systems and Meeting Completion Dates.** By J. O. Dugdale-Bradley (*Shell Chemical Co. Ltd*).

Working from the assumption that an accepted process is available, several forms of planning system are delineated with types of aids employed: the bar chart, curve, and vector are shown as tools for the purpose of organizing and controlling a chemical plant construction project and the merits of each are described.

A system employing two of these is proved to be the best and its application is demonstrated. The various responsibilities of the project and construction engineers are giving their overlapping spheres of interest, and the whole makes an efficient system for bringing a project to a successful conclusion.

The desirability of phasing the various sections of the work is stressed in order that they may all mature together. A follow-up using all the assembled data is shown to be essential for ensuring that the job is adequately co-ordinated and kept on schedule.

**Programming and Progressing Systems and Meeting Completion Dates.** By W. V. M. Kelly (*The Power-Gas Corporation Ltd*).

The client's examination of the tender-stage programme enables assessment of the validity of the offer and of the effect of delays in acceptance and releasing of specification to be made.

Further information, cost control, and policy decisions are required to develop a sectionalized and co-ordinating master programme, based on the work content of all types and phases of work and such limitations as staff, labour, materials, physical site conditions. Sub-contract work should be similarly treated. Programme revision must be resisted but, when unavoidable, dealt with urgently.

Progressing requires periodic examination of programme-achievement and this applies to all work from design to commissioning. Correspondence and inspectors' reports can be as credible as routine progress chasing. Visits are most effective at senior level by persons conversant with consequences of delays and competent to make constructive suggestions. Meeting completion dates depends upon effort expended in organization and planning and on authority, initiative, and drive of the man in charge. All engaged on the project must have clear terms of reference. Early freezing of design, prompt bulk ordering, adequate supervision, and liberal use of mechanical equipment are important.

Client and contractor should recognize incentives for early completion; their close collaboration promotes good relations between staffs, appreciation of problems, and the need for prompt decisions.

**Cost Estimating and Control.** By P. Brett (*Imperial Chemical Industries Ltd*).

The commercial assessment of a project may have to pass through many stages before the expenditure is authorized, each stage requiring an estimate of capital cost. To avoid delaying a proposal, it is important not to waste time estimating to a higher accuracy than is warranted by the particular stage reached.

The less accurate estimates can often be done in minutes, either by analogy with existing plants, or by multiplying the purchase cost of the plant equipment by a factor. By spending a few hours on the estimate of plant equipment its accuracy can be improved and a more considered factor chosen. Alternatively, the total can be obtained by adding to the equipment cost the other sectional costs, *e.g.*, buildings, instruments, etc. each obtained by multiplying the equipment cost by a factor. When an accurate estimate is required, with more time available, it is still often necessary to estimate the cost of erection and pipework in this way.

The most important "cost control" operation is the check against the estimate by the engineer ordering equipment as each order is placed. Another check is possible from "expenditure and commitments" graphs but these can be misleading early in the project. Detailed control estimates are valuable once almost all the equipment is ordered and the civil and structural contracts are placed.

The final session, at 10.10 a.m. on 26 June, will be chaired by the President of The Institute of Petroleum, and four papers will be presented. These are:

**Plant Commissioning.** By D. W. K. Barker. (*British Petroleum Co. Ltd*).

The paper describes, broadly, events and experience in the commissioning of a large new "grass-roots" oil refinery which, by reason of its location in a remote non-industrial area, presented its sponsors with a large variety of problems from conception to completion. The thinking and planning behind the intricate operation of bringing a complex of process plant, utilities, and all their

associated services into commercial production are dealt with more extensively than the specific activities relating to the testing, start-up, and adjustment of different individual units. Particular emphasis is given to important factors on which prompt and trouble-free commissioning is considered to depend; close co-ordination of construction and commissioning programmes; the elimination, by exhaustive trials, of the risk of mechanical failure; the selection, training, and conditioning of staff and labour, and, *inter alia*, the strict adherence to minutely detailed procedures. Comments are made on certain current trends in instrumentation, methods of process control, and integration of plant.

**Plant Commissioning.** By A. F. Cottrell (*Woodall-Duckham Construction Ltd*).

Modern large coke-oven batteries with their associated by-product plant form complex but closely integrated units when at work.

This paper briefly describes the procedure for putting into commission a coke-oven plant capable of carbonizing 1000 tons of coal per day, and the care and precautions which are necessary at each stage.

The technical control during the three main stages of initial testing, heating up, and production are described.

**The Analysis and Future Use of Project Records.** By S. T. Card (*The Distillers Co. Ltd*).

Engineering groups which carry out chemical engineering projects vary in size, methods, and organization.

This paper examines the project records kept by an engineering division which is part of a large industrial group engaged in the manufacture of chemicals, plastics, and antibiotics.

The division has its own design staff, and specialist technical sections, carries out procurement, inspection, and progressing of plant and equipment, and supervises construction work for which outside contractors are normally employed.

The records kept for such a project are classified as follows:—engineering and design; procurement, inspection, and expediting; financial and estimating; administrative; operation.

These records are discussed from the point of view of the application of lessons to be learned from them to future projects, bearing in mind the three main criteria of success in project work, *i.e.*

1. Completion to technical satisfaction;
2. Completion within the time programme;
3. Completion within the financial authorization.

A number of conclusions, derived from the story of project records, are discussed.

**Analysis and Future Use of Project Records.** By R. Adams (*George Wimpey & Co. Ltd*).

The subject considered is the construction of process plants on prepared foundations.

The object of analysing job records is:—(a) To check the data on which the project was based, to find an explanation of any discrepancies, to locate means of improving efficiency, and (b) To amend and extend the data as a result of the further experience.

Such analysing must be carried out by competent and experienced personnel. Analyses cannot be more accurate than the data upon which they are based, and job records should be made as factual as is reasonable and be accompanied by notes on any influencing circumstances.

Owing to technological advances, site and process requirements, and many other factors, construction conditions on different projects vary considerably. Consequently, to make full use of recorded information, the data must be reduced to some common basis. With this, factors can be applied to adjust for variations, such as for a different site, or for size and complexity of the unit. Determination of these factors, which are empirical, is necessary to the full use of records.

It is stressed that the information derived from job records should be used during the course of further construction, as a control basis of progress on the new job.

The Conference is open to members of The Institution of Chemical Engineers, of The Institute of Petroleum, and of the constituent bodies of the European Federation of Chemical Engineering, at a registration fee of £2. To others the fee is £3.

The full proceedings will be published in book form and will form a valuable reference work. Copies can be ordered in advance from the General Secretary, The Institution of Chemical Engineers, 16 Belgrave Square, London, S.W.1.

## KUWAIT OIL REVENUES

At the Oil Industries Club luncheon in May, C. A. P. Southwell, C.B.E., managing director of Kuwait Oil Company Ltd, speaking before a very representative gathering of those connected with the petroleum and allied industries, pointed out that an entirely erroneous impression was abroad that Kuwait oil revenues were private fortunes. The true facts concerning Kuwait finance arrangements, he said, were that all revenues from oil and other sources are paid into Government funds and utilized for Government purposes, being administered through the finance department of the Government. As would be well-known to everyone, the Ruler had directed that oil revenues should be devoted to public purposes and only a modest amount is retained for his personal or official life.

## MIDDLE EAST OIL PRODUCTION

| | *March* | *Jan.–Mar.* |
|---|---|---|
| | *Tons* | |
| Iraq Petroleum Co. Ltd ... | 1,633,444 | 4,468,870 |
| Basrah Petroleum Co. Ltd ... | 918,824 | 2,617,576 |
| Mosul Petroleum Co. Ltd ... | 109,457 | 322,445 |
| Qatar Petroleum Co. Ltd ... | 730,574 | 1,935,821 |
| Iraanse Aardolie Exploratie en Productie Mij ... ... | 3,479,000 | 9,781,000 |
| Kuwait Oil Co. Ltd ... ... | 5,836,825 | 16,421,408 |
| | *Barrels* | |
| Arabian American Oil Co. (Saudi Arabia) ... ... | 32,579,568 | 92,673,954 |
| Bahrain Petroleum Co. Ltd ... | 1,163,176 | 4,230,236 |

The refinery throughput at Abadan of the Iraanse Aardolie Raffinage Mij for March was 1,395,000 tons, the total for 1 January to 31 March being 3,803,000 tons.

Crude processed at Aramco's Ras Tanura refinery for March was 6,702,570 brl, the total for 1 January to 31 March being 17, 565, 654 brl.

Oil deliveries from Sidon, Lebanon by Trans-Arabian Pipe Line Co. in March were 11,589,042 brl, the total for January to March being 30,969,981 brl.

# 1957 and its Implications for the Oil Industry*

By J. S. SENIOR†

Since the 1939–45 war the oil industry has got so used to growing bigger and bigger and breaking its own records that a year like 1957 comes as a bit of a shock. Free world oil demand showed its weakest annual gain for more than 10 years—at less than 3 per cent. Of course, circumstances over which the industry had no control occurred. There was a levelling-off in economic activity, the weather was unhelpful, and the Suez Canal was closed—for a time at least.

In the U.S.A. domestic demand in 1957 was unchanged from the previous year. In the first quarter the weather was abnormally mild and though there was a rise in demand, in relation to the previous year's first quarter, it was small. In the second quarter there was a real decline in offtake with the prospect of falling prices in view and in the last two quarters the general economic situation markedly affected demand. (Fig 1).

In Europe, consumption was artificially restricted in the first quarter because of the Suez emergency and for the remainder of the year, although demand increased, the gain was not as great as had been forecast. For the year as a whole less than 2 per cent was registered compared with between 10 per cent and 20 per cent in earlier years.

The Canadian economy also levelled off in the second half of the year and the year's gain was about 4 per cent. Only in the less developed areas of the world was demand fairly normal, but the level of consumption in these areas was not sufficient to counterbalance the low gains in North America and Europe.

The events and results of 1957 really turned on two main factors—the Suez emergency during the first few months and the decline in economic activity in the United States towards the end of the year.

### Suez Emergency

The closure of the Suez Canal and I.P.C. pipelines in November 1956 constituted a grave threat to the European economy. The use of oil in Europe was growing rapidly at that time (15 per cent per annum) as this was the only ready form of energy which could fill the growing requirements. Transportation was already at a premium as tanker rates in 1956 had never fallen to the normal low levels in the summer. The prospects of moving crude from the Persian Gulf *via* the Cape of Good Hope to Europe were not bright and the situation was immediately reflected in spot rates for tankers, which rocketed to the highest level since the war. However, by reducing Persian Gulf loadings and supplementing these with imports of crude and products from the Caribbean and Gulf Coast the transportation side was eased to some extent. Laid-up tankers were brought into use and Middle East crude imports to the U.S. were largely reduced.

That emergency supplies were available in such volume was largely due to the high level of crude stocks in the U.S. at the end of October 1956—283 million barrels—which was abnormally high for the time of year. The depletion of these stocks was welcomed by some American producers and there was a reluctance to increase production until these stocks had been well worked off. With gasoline rationed by price or controls in many European countries product imports were mostly in the heavy range; this only aggravated a high stock position of gasoline in the States, since American refiners

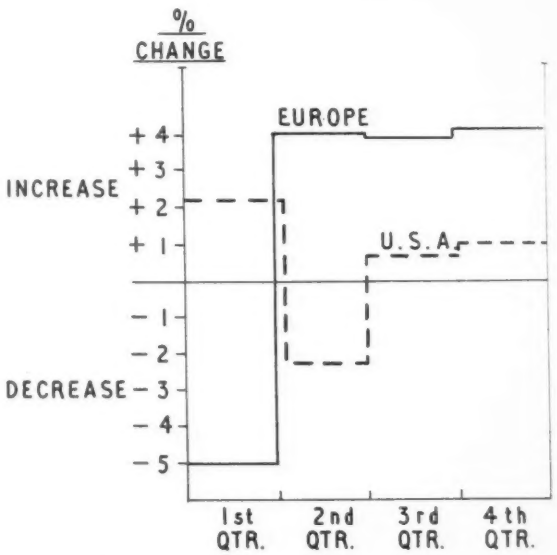



*Fig* 1. *Total domestic demand—U.S.A. and Europe.* 1957 *v* 1956

*Read at a meeting of the IP Economics and Operations Group on 10 April 1958.

†Esso Petroleum Co. Ltd.

were not quick to change their production pattern. As a result, some American suppliers tried to make exports of crude and fuel conditional upon purchase of gasoline.

Back in July 1956, when the Suez Canal was nationalized, the oil industry had been alerted of the potential dangers that lay ahead and in the succeeding months before the Canal was blocked organizations had been set up to cope with the situation of re-routing and rationalizing oil transportation on an international scale. In the United States the Middle East Emergency Committee was formed. This committee, consisting of representatives from United States oil companies having foreign oil interests and working under Government supervision, contributed a great deal towards reducing the effects of the crisis.

In Europe, the task of ensuring equitable distribution of supplies between countries was taken up by the OEEC Petroleum Emergency Group (OPEG). In general, most European countries survived the emergency period without severe cuts in industrial production. There was a serious dollar payments problem, however, and the U.K. bore a large part of this burden since over half Europe's oil is normally paid for in sterling. One factor which should not be forgotten in considering the impact of Suez is the weather during the winter 1956/57. This was milder than normal in both the States and in Europe. Had the weather been severe more serious shortages would certainly have occurred, primarily because of limitations of the world tanker fleet.

At the end of 1957 the Oil Committee of the OEEC issued a report which traced the course of events during the period of emergency and set down some lessons to be learnt from Suez as far as Europe was concerned. The committee made three main recommendations. First, in regard to accumulation of large reserve stocks in Europe, it was acknowledged that this would be a very costly method of safeguarding supplies as a single day's requirements would involve capital expenditure estimated at $20 million. This proposal is receiving active attention by the OEEC but it will be appreciated that much consultation between all the interested parties will be required.

The second point was that added flexibility of transport should be developed. The problem which the closure of Suez posed was undoubtedly one of transportation. It was overcome by marshalling the industry's resources on an international scale which was impressive, but at a cost. For those who had to charter marginal tonnage, the voyage cost from the Persian Gulf to the U.K. *via* the Cape rose to £18 a cargo ton.

This prompts the questions—"What can be done to minimize the additional costs in the event of any future dislocation in supplies and what is the optimum size of tanker for use on the Middle East to NW Europe run?" Generally speaking, the larger the vessel the cheaper the cost of transporting the oil. However, there are a number of other factors which have to be taken into account in determining the most suitable size of tanker to build for this service. In considering moving oil from the Persian Gulf to Europe the depth of the Suez Canal is of great importance. Before the Canal was nationalized the Suez Canal Company planned to increase the depth to about 37 ft. If it is assumed that the Egyptian authorities will proceed with this plan then a 45–50,000 dw-ton tanker would be the largest that could use the Canal fully loaded and a 65–70,000-ton vessel would be the largest that could go through in ballast. Any larger vessel would be limited to operating on the Eastern Mediterranean haul or to and from the Persian Gulf *via* the Cape of Good Hope. Until there are ports and dry docks to accommodate tankers in the 80-100,000-ton range lack of flexibility largely rules them out. In any event, at about 80,000 dwt twin screws are needed if a reasonable speed is to be achieved; this puts the cost up to a point where the 80,000-tonner is at no advantage compared with the 65,000-tonner.

Given the Canal depth and suitable ports of discharge, the 45–50,000-tonner is the best choice for transporting oil from the Persian Gulf. However, the 65,000-ton vessel shows a 2*s* per ton advantage over the 45,000-tonner on the Eastern Mediterranean/U.K. haul while the same vessel travelling in ballast through the Canal to the Persian Gulf and returning to the U.K. loaded *via* the Cape is at a corresponding disadvantage to the 45,000-ton tanker. If it is not possible to use the Canal, due to saturation or a further crisis, the larger vessel shows a 6*s* per ton advantage travelling *via* the Cape both ways. If 65,000-tonners can be fully employed on the short haul from the Eastern Mediterranean and ports of discharge are available to handle them, then this size of vessel has obvious merits since it provides that added flexibility in times of crisis.

### The Tanker Situation

The industry was aware of the merits of large tankers even before Suez and many such vessels were planned. Few large tankers (over 40,000 tons) were actually in operation however, and Table I shows the trend in tanker sizes. In October 1956 only 9 tankers exceeding 40,000 tons were in operation but by October 1957 the number had increased to thirty-four. The aggregate deadweight tonnage of these large tankers increased from 400,000 to 1·6 million and now represents nearly 4 per cent of total tanker tonnage. The increase in tonnage during the year amounted to 4·8 million—a rise of 11 per cent, and deliveries in 1958 and 1959 are likely to be even higher at about 7 million tons each year.

Table II, of tanker tonnage under construction or on order, shows the rate at which this trend to larger tankers is gaining ground. The total tonnage on order at 1 October 1957 stood at 40 million—nearly as much as the present world fleet. This is an increase of 17 million tons during the year. In other words, orders were nearly doubled. This rapid advance in 12 months may to some extent be due to the Suez emer-

TABLE I

FREE WORLD TANKER FLEET

| *Deadweight tonnage* | *Oct.* 1956 | | | *Oct.* 1957 | | |
|---|---|---|---|---|---|---|
| | *No. of tankers* | *Total million dwt* | *Per cent* | *No. of tankers* | *Total million dwt* | *Per cent* |
| 6000–20,000 | 1895 | 28·5 | 70·9 | 1939 | 29·4 | 65·4 |
| 20,000–30,000 | 303 | 7·5 | 18·8 | 332 | 8·2 | 18·3 |
| 30,000–40,000 | 113 | 3·7 | 9·2 | 171 | 5·7 | 12·6 |
| Over 40,000 | 9 | 0·4 | 1·1 | 34 | 1·6 | 3·7 |
| | 2320 | 40·1 | | 2476 | 44·9 | |

Tonnage increase: 11 per cent

TABLE II

TANKERS UNDER CONSTRUCTION OR ON ORDER

| *Deadweight tonnage* | *Oct.* 1956 | | | *Oct.* 1957 | | |
|---|---|---|---|---|---|---|
| | *No. of tankers* | *Total million dwt* | *Per cent* | *No. of tankers* | *Total million dwt* | *Per cent* |
| 6000–20,000 | 305 | 5·4 | 23·5 | 345 | 6·3 | 15·7 |
| 20,000–30,000 | 97 | 2·4 | 10·3 | 170 | 4·2 | 10·6 |
| 30,000–40,000 | 287 | 9·9 | 42·6 | 361 | 12·7 | 31·8 |
| Over 40,000 | 89 | 4·3 | 18·4 | 303 | 15·6 | 39·1 |
| Unspecified | 42 | 1·2 | 5·2 | 32 | 1·1 | 2·8 |
| | 820 | 23·2 | | 1211 | 39·9 | |

Tonnage increase: 72 per cent

gency, though the period of high freights was quite short-lived and not the sort of situation which would make the independent operator rush to order more tankers. In fact, a large part of the new tonnage was ordered by integrated oil companies.

The trend in vessel size is most marked here. The proportion of over 40,000-tonners on order has risen from 18 per cent to 39 per cent, while their total tonnage has increased from 4·3 million to 15·6 million dwt. These statistics seem strange in the present state of the tanker market. Commercial tanker tonnage laid up exceeds 4 million tons now and is still increasing. Many operators are running at reduced speeds and others are travelling from the Persian Gulf to Europe *via* the Cape to avoid laying up even more ships. However, the fact that the number of cancellations which have been made is small in proportion to the total tankers on order indicates that most operators are confident that the present situation is only temporary.

According to a number of independent assessments, there is every indication of a world surplus of tanker tonnage for the next few years, but while this seems likely, such studies are inevitably based on a large number of assumptions relating to future demand and the pattern of oil movements. While, generally speaking, neither of these factors changes overnight, Suez provided a classic example of the sudden changes which can occur. Political conditions in the Middle East are still very uncertain and President Nasser now has virtual control of all normal movements of oil to the West. Although the trunk pipeline planned from the Persian Gulf to the Mediterranean, which was studied in detail during 1957, avoided Syria by being routed through Turkey, the general political climate in the Middle East must have played a part in the recent announcement, reported in *The Financial Times* that the scheme has been shelved, quite apart from the growing surplus of tankers.

### Middle East Production

Crude production in the Middle East during the 6 months of the emergency was 30 per cent below that immediately preceding the crisis. To the Governments of Middle East producing countries this represented a considerable loss in revenue. This is the measure of the Middle East's dependence on Western markets and it is obviously in their own interests to maintain supplies and the normal routes of transportation. The fabulous reserves already established have caused certain Governments to seek added benefits from exploration in new parts of their territories. 1957 saw the emergence of certain new oil agreements which departed from the traditional 50-50 basis.

Two such agreements have been made—one between the Iranian Government and the Italian-Government-controlled AGIP Mineraria, which has been labelled 75-25 and the second between the Saudi Arabian Government and a private Japanese company referred to as 56-44. These agreements may seem very favourable to the Iranian and Saudi Governments but in fact they forego the immediate advantage of bonus payments for the concessions, which in these areas could have been very large. Although the Italians in their agreement are shouldering the entire burden of exploration, their partner, the National Iranian Oil Company, will have to put up capital to produce and transport any oil found. If no oil is found, which admittedly is unlikely, the Iranian Government will get little out of the agreement. By contrast, if they had entered into a normal 50-50 agreement, they could expect not only a large initial bonus payment but an annual rental on the area, whether oil was found or not.

The terms of the Saudi/Japanese agreement are very complex but briefly Saudi Arabia will receive, in addition to an annual rental, royalties and taxes equivalent to 56 per cent of the Japanese company's net income from all phases of operations—including transportation, refining, and marketing —both inside and outside Saudi Arabia with a guaranteed minimum royalty of 2½ million dollars a year. Again it is true to say that the concession area has very good prospects but to dispose of the refined products which the Japanese are committed to make they will have to build up transportation, refining, and marketing facilities which will require time and capital. In this way it may be several years before the Saudi Government reaps the full benefit of this agreement. The 50-50 principle has worked well and it relieves the country of any financial risk and places the risk upon the company which is in a position to evaluate it and spread the risks of the search for oil over many areas.

Although Europe's dependence on Middle East oil is very great, the growing crude-oil producing capacity that exists outside the Middle East should be borne in mind. Venezuela, for example, in 1957 increased production by 13·5 per cent and crude reserves by nearly 15 per cent. If the added potential from the development of new concessions granted in 1957 is also taken into account, Venezuela seems likely to hold its position as the world's largest exporter for many years to come. As a point of interest, Venezuela received $370 million against the award of new concessions in 1957 which it can spend immediately in developing social and other services. A great deal of speculation has centred on developments in the Sahara in the past 12 months. Already the Hassi Messaoud field in Algeria has been developed to a point where proved reserves are estimated at 300 million tons while more optimistic estimates put reserves around 1000 million tons. Other fields have been discovered near the Algerian/Libyan border and plans to pipe crude from these fields to the Mediterranean coast are already under way. Proved reserves in the Sahara are as yet minute in comparison to the Middle East reserves, but hopes for the area are running high.

The development of new productive capacity outside the

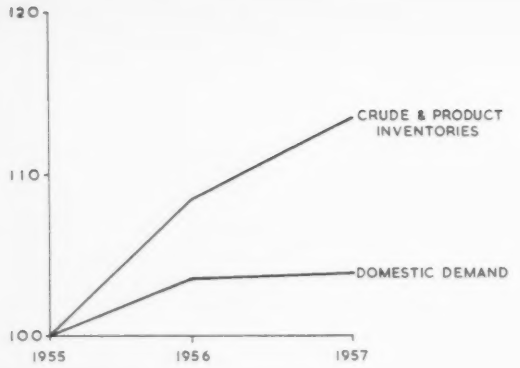



*Fig 2. Demand and inventories in the United States (1955 = 100)*

Middle East to reduce Europe's dependence on that area is the third of the recommendations made in the OEEC report; the results achieved in the short time since Suez are encouraging.

What of Europe itself? After all, the predominant interest in Middle East oil is in maintaining supplies for Europe—Europe takes about 70 per cent of Middle East production—and oil from the Sahara will be largely destined for Europe. Reserves of crude in Europe rose very little in 1957 but production gained over 14 per cent—probably spurred on by the need during Suez. Although Western Europe's reserves are small in relation to the area's requirements, domestic production represents 10 per cent of refinery throughputs ranging from 30 per cent in Germany to less than ¼ per cent in U.K. It is sad to say that no sizable deposits have yet been found here in Britain.

Production in the free world last year was about 750 million tons—an increase of nearly 3½ per cent—the lowest for some years. On the year as a whole, production in the U.S. showed no gain despite the increase made in the early part of the year to provide emergency supplies. The Middle East, after falling well behind in the first half, made up the backlog and by the year-end had produced nearly 4 per cent more than in 1956.

### The U.S. Supply Position

Turning now to the position in the States during 1957, the first happening of major importance was the general increase in crude prices in January. This was no doubt brought about to some extent by the emergency requirements for Europe following Suez, but informed observers have affirmed that a crude price increase was inevitable, due to rising costs of exploration and production. This was the first general crude price increase in the States for 3½ years.

Even while the emergency shipments to Europe were at their peak in the first quarter of 1957, warnings were being sounded that corrective measures would have to be taken when the Suez Canal was cleared, if not before, to prevent a serious over-supply position developing with all its implications. At that time it was apparent that domestic demand was not increasing at the expected rate. However, these warnings were not heeded and production continued at a high level until May, by which time the Suez Canal was open. Crude stocks and refinery throughputs were maintained during the second quarter with the result that inventories by mid-year were 8½ per cent higher than a year earlier, and by this time emergency supplies had almost ceased. Reflecting this position, product prices began to slip during the second quarter and it was at this time that domestic producers began to voice their opposition again to the increasing level of oil imports. The U.S. administration recognized that the rate of oil imports was beginning to threaten national security. It was as a result of this that the voluntary import plan was put into operation under which imports would be restricted to about 700,000 b.d. into the districts east of the Rockies. Later in the year a similar plan was announced for reducing West Coast imports as these too showed every sign of getting out of hand in 1958. The bulk of imports originated from Venezuela, the Middle East, and Canada. So far Venezuela seems to have taken the bulk of the cut. Up to the end of 1957 this voluntary programme seemed to be working pretty well, but to continue the story into 1958, the result of the first few months had thrown some doubt on the administration's ability to continue with the programme on a voluntary basis. It has now been re-affirmed that imports will continue on a voluntary basis, but President Eisenhower has ordered a cut-back representing about 8 per cent to take effect from April. In order to permit additional companies to enter the importing field and obtain quotas, those who already hold quotas will have these cut by more like 15 per cent.

Demand continued to ease in the United States in the second half of the year and by the fourth quarter the effect of a recession was being felt. The sharp cut-backs both in crude production and refining throughputs in the second half were still unable to stem the rise in inventories and these rose to a new peak, some 8 per cent above the 1956 levels, and Fig 2 shows the out of balance position which occurred. Product prices continued their steady slide and refiners' margin dropped to around 70 cents a barrel by the end of the year and has continued to fall since (Fig 3). Any additional profit which the refiner gained during the early months of the year was subsequently absorbed, so that by the end of the year there

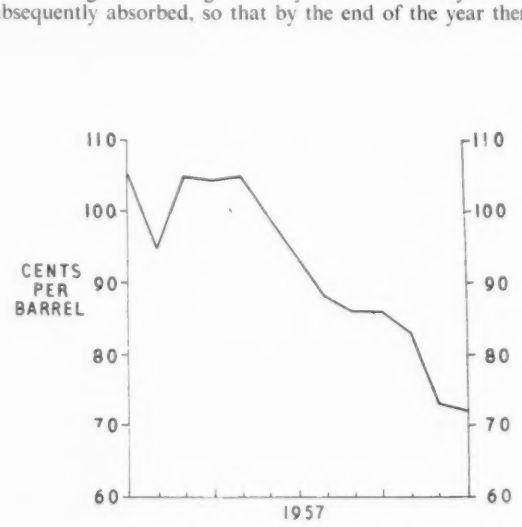



*Fig 3. Gulf Coast refiners' margin*

was increased pressure to reduce crude oil prices. So far, however, although there have been a number of price reductions in Venezuela and in some parts of the United States there has been no general price reduction and this was due to some extent to the very cold weather in February which gave a sudden and welcome lift in demand.

Despite this rather dismal picture of the U.S. situation in 1957 and the general doubts which are being voiced about the prospects for recovery this year there seems little question that demand for oil will continue its strong upward course in the longer term. Bad years now and then are inevitable, but they should not be allowed to influence too much long-term planning. Large-scale investment must go on even in times of recession because when world trade returns to normal there can be a sudden surge in demand as the long-term trend is resumed. Investment in the oil industry in 1957 was about the same as in 1956 but it should be remembered that investment in 1956 jumped nearly 20 per cent from the previous year. It is usual now to expect that a large part of the capital needed is met from internally generated funds, but with the cost of equipment and materials rising faster than oil prices it is not surprising that a number of major oil companies have made new capital issues in recent months.

Investment in production represents nearly two-thirds of all investment and the trend of increasing capital requirements per ton of new crude production capacity in the United States continues at a greater rate than in the rest of the world. If the trend in the States continues—and it shows every sign of so doing—then imported crude will become more and more attractive. It seems inevitable, despite present restrictions on imports of crude into the U.S., that in the years ahead American imports will increase substantially and the Middle East may influence world prices more than it does to-day. In 1957 posted prices were introduced for products in the Persian Gulf. Because of the limited availability of finished products in the Persian Gulf for which ready markets are available in the Indian Ocean the product postings do not show the same sort of price differentials to those in the U.S. Gulf/Caribbean as is the case with crude oil. Although the prices have not shown the same degree of change as those in the U.S. Gulf they have shown the same trend and have often moved in sympathy with U.S. Gulf prices.

Products from the Persian Gulf do not compete on price with Caribbean products in north-west Europe. At a freight of MOT flat the laid-down cost of fuel oil from the two sources breaks even in the area of Southern Italy but at current spot freights there is little difference in the delivered prices in the United Kingdom.

Expansion of refining facilities has continued in 1957, undisturbed by the slackening in demand. 50 million tons/year of new capacity was added—a gain of 6 per cent, which is slightly lower than the post-war average. Outside the U.S.A., however, the year's gain was nearly 10 per cent.

As in the case of tankers, it is essential to lay plans for refining capacity well in advance not only because of the actual time involved in construction but also because of the detailed studies required in choosing the correct location. It is therefore necessary to anticipate future demand and as a result there is usually between 10 per cent and 20 per cent of spare capacity in the world. With large increases in demand for fuel oil and middle distillates in prospect and with gasoline demand rising at a much more modest rate few new refineries will have catalytic cracking plants. More common will be catalytic reforming, giving the benefits of high-octane gasoline without the increased volume associated with catalytic cracking. In some cases no gasoline improving facilities will be provided at all and this will lead to a simplification which will be reflected in a lower cost per ton of capacity, a welcome and necessary step if the refinery is to produce little of the highest-priced product.

### U.K. Consumption

How did the U.K. oil industry fare in 1957? Overall demand was down 2 per cent on 1956 but this can largely be attributed to restrictions on consumption in the first few months of the year. Gasoline was hardest hit because of rationing; other products were restricted less severely. There was a mild winter at the beginning of 1957 and a mild autumn which also limited consumption. The Suez crisis broke with ample coal stocks and at the end of 1956 they were higher than at any time since the end of the war. Uncertainty about oil supplies both immediately and in the long term delayed planned conversions from coal to oil. In the event, industrial production was not seriously impaired by lack of oil and shortly after the emergency ended, conversions were resumed. Fuel oil indeed was the only major product to show a significant gain on the year—this was about 7 per cent. There are indications, incidentally, that economies in oil consumption, both for industrial and automotive fuels, which were practised during the emergency have been continued. While efficiency in the use of fuel is obviously desirable from the standpoint of the national economy, this is yet another factor in accounting for the lower oil consumption last year.

After saying all this it is surprising—but encouraging—to find that, as a proportion of total energy consumed in the U.K., oil showed a slight increase compared with 1956. As far as the U.K. is concerned, the oil industry can still look forward to a rapid growth of demand. In 10 years time atomic energy will provide only one third of the increase in energy requirements. If the National Coal Board meets its target for coal production this still leaves a large part of incremental energy to be met by oil. The experimental importation of liquefied natural gas will be watched with great interest but even if this proves technically and economically feasible, it must be many years before this can make a substantial contribution to Britain's energy needs.

### Future Prospects

What are the prospects for the oil industry in the world at large? The plans for expansion of the world tanker fleet and refining capacity seem adequate, if not more than adequate, to meet the needs of the industry over the next few years. Exploration and productive capacity too will be equal to any likely growth in demand. Demand itself is the largest imponderable. In 1957 a real slow-down in growth of demand occurred which looks like continuing in 1958. It seems likely that demand will pick up again in 1959, but whether in the succeeding years the growth in demand will be comparable to the 8 per cent per annum average since the war is more in question. There are signs that the historical ratio of energy demand to industrial production or gross domestic product is not being maintained, the causes of which are somewhat obscure. It might be due to increased efficiency of usage but this has been going on continuously and one would hardly

expect any sudden improvement here. In addition coal supplies are now much more plentiful—the U.S. coal industry is facing difficulties in disposing of its production—and atomic energy, although so far only in the embryonic stage, is a further competitor in the energy field.

The oil industry's main problem will be to keep a steady hold on the reins, to ensure that supply and demand are kept in balance. If they are not, there will be a recurrence of the situation which arose during 1957. However, it is easy to say keep production in balance with demand but quite another thing to achieve it, especially when this involves operating well below productive capacity.

How this balance will be achieved it is difficult to predict, but this looks like a tough problem which will have to be faced.

## Discussion

Asked how individual product demand compared with the overall movement in demand in the U.S.A. and Europe, Mr Senior replied that in Europe the thing which stood out was the advance in fuel oil which gained steadily throughout the year as a proportion of total demand. Gasoline demand was artificially restricted in the first quarter and in the rest of the year showed only a small gain. Although distillate demand showed a moderate gain in the second half-year the warm weather in the first quarter largely offset this.

In the U.S.A. the proportion of fuel oil to total demand fell throughout the year and was particularly marked in the last quarter. Distillates were down on the year because of the mild heating seasons, and the gains in gasoline demand were very modest.

As to the effect of Suez on conversions to oil firing in the U.K., Mr Senior said that, although there were some cases of conversion plans being dropped due to lack of confidence, conversions in the main were merely delayed by six months or so during the period of high oil prices.

The threat to vital energy supplies which the Suez closure created was reflected in the acceleration of atomic energy plans. This source of power would be a serious competitor to oil in the field of energy and Mr Senior considered that in time oil might have to accept a reduced share of energy markets and develop chemical outlets which would make greater use of oil's potentialities as a raw material.

On the question of handling facilities at ports for 40,000-ton tankers and over, Mr Senior replied that already there were a number of ports capable of receiving these vessels; at least two ports in Britain and two on the Continent could handle these tankers, and more were planned.

Asked about general prospects in the Sahara area, Mr Senior replied that prospects were good but production was unlikely to rival the Middle East, on the basis of current geological data. However, although exploration had been in progress for a relatively short time, the reserves found of 300 million tons would give an output sufficient to maintain nearly half of France's requirements for 25 years, and this was only a beginning.

In answer to a question on what the industry would do if present trends to overproduction of light fractions continued, Mr Senior suggested that there was still scope for reducing gasoline production in the refining process, and beyond that there was a growing need to develop other outlets for naphtha either as a chemical feedstock or a fuel. In the U.K. the Gas Boards had plans for the extensive use of naphtha in their catalytic gasification units and there were proposals to use it for carburetting. In the last resort, crude might have to be topped at the field and the naphtha returned to the formation. One speaker thought that topping the crude might bring a long-term benefit to the industry in increasing the yield from deposits.

Asked whether 1957 might be a turning-point in the industry's history, Mr Senior replied that, despite the Suez emergency and the many other changes in fortune which the industry had had to face in 1957, he did not think that, apart from being a freak year, it would necessarily stand out in the industry's history. It was perhaps significant that the tables were turned on supply and demand with apparent surplus productive capacity, but this might be just a feature of the present depressed level of demand; one speaker who said that these situations always looked worse at the time than in retrospect was confident that by the use of the price mechanism and other adjustments available to the industry a balance would shortly be restored.

## Shell Placed £50 Million Orders in U.K.

During 1957 business to a total value of £50 million was placed with British industry, and spread over some 3500 firms, by the Royal Dutch/Shell Group of companies. Additionally, many millions were spent on the construction, repair, and victualling of the Shell tanker fleet, and on the petrochemical side of the business.

Of the £50 million, £38 million was for materials for exploration, manufacturing, and related activities in many parts of the world. The balance of £12 million covered materials and equipment for maintenance and expansion of the group's U.K. oil refineries and for research operations in Britain.

Of the 3500 U.K. suppliers concerned, one received orders of over £5 million, five others of over £1 million, and sixty-seven of over £100,000.

Linepipe and oil-country tubulars figured large in the year's purchases, and orders on U.K. mills totalled 92,600 tons, to a value of approximately £6½ million. Notable purchases during the year included a 350-ft radio tower now installed at Lagunillas in Venezuela for radio communications in the Lake Maracaibo area. Two mobile repair trucks, fully equipped for day and night emergency repair work in the oilfields, were also supplied. A fleet of six air-conditioned caravans was supplied for the use of survey and exploration parties in Pakistan.

There are few products of British industry which the Royal Dutch/Shell Group of companies does not buy at some time or another. Items regularly purchased include explosives for seismic surveys; trailer-mounted drilling rigs; pumps, compressors and instruments for oilfields and refineries; and storage tanks, bulk lorries, and packages of all kinds for the marketing side of the business.

Equipment less obviously of use in the oil industry is also purchased extensively. To far-away places where oilfields are located in desert or jungle—or, to an increasing extent these days, on lake or ocean bed—vast quantities of building materials, furniture, kitchen equipment, and utensils, etc., are supplied to establish and maintain small communities nearby—or even townships—for the personnel involved. As operations develop, roads, hospitals, clubs, and schools have to be built, and, for the maintenance of these and the well-being of the population they serve, British industry supplies annually large quantities of a wide range of common user items, such as stationery, drugs and hospital requisites, gramophone records, and ironmongery.

Actual shipments from the U.K. during 1957 totalled £37 million in value, and represented 1·12 per cent of U.K. exports. Transport by sea and air of the 77,000 consignments which comprised this total, to destinations in over one hundred countries overseas, involved payment of some £3 million in freight.

# IP Council and Officers 1958-59

Photograph by Walter Bird

*C. M. Vignoles, C.B.E.*

At the Annual General Meeting of the Institute on 22 April C. M. Vignoles, C.B.E., was unanimously elected as President for the Session 1958–9.

*The President*

**C. M. Vignoles,** C.B.E., is managing director of Shell-Mex and B.P. Ltd, a position which he has held since March 1951. Joining the Shell Group in 1924 he first served in Malaya on the technical side of the Bitumen Sales Department. After transfer to the executive side he joined the Shipping Department in Singapore and was later Branch Manager in Malacca.

Returning to the London office in 1932, he was in the Fuel Oil General Department and, in 1940, became Shell's representative on the Overseas Supply Committee of the Petroleum Board. Later he became Joint Executive Secretary of the Committee and in 1946 was appointed an O.B.E. for his services. Ten years later he was appointed a C.B.E.

The war over, Mr Vignoles was made Eastern Area Manager of the Shell Group in 1946 and at the end of 1950 became a director of Shell-Mex and B.P. Ltd. During the Suez crisis he was chairman of the Oil Industry Emergency Committee. This Committee was formed to assist the Ministry of Power in dealing with the problems of rationing.

Among his many interests, Mr Vignoles is Trustee of the Civic Trust, a member of the Clean Air Council, of the Council of the Institute of Directors, and of the Council of Operation Britain.

*Vice-Presidents*

At the same meeting, three new vice-presidents were elected on the nomination of the Council to replace the three retiring vice-presidents—Dr E. B. Evans, A. C. Hartley, C.B.E., and E. J. Sturgess, C.B.E. The new vice-presidents are W. S. Ault, Professor Frank Morton, and J. S. Parker.

*W. S. Ault*

**W. S. Ault,** B.A., joined the Shell Group in 1936 at their Shell Haven refinery and in 1939 was transferred to Suez refinery of the Anglo-Egyptian Oilfields Ltd. In 1944 he returned to Britain to take up the position of assistant refinery manager at Stanlow refinery, where he remained for the next two years. In 1946 he left the refining side of the industry and was appointed technical adviser to Shell-Mex and B.P. Ltd. In 1949 he returned to the Shell Petroleum Company as manager of their Sales Technical Advisory Department. In 1952 he rejoined Shell-Mex and B.P. Ltd as manager of their Technical Department, which is the position he holds to-day.

In addition to his work in the petroleum industry, Mr Ault has for some years past been a member of Council of the Motor Industry Research Association and is at present a member of their Management Committee and chairman of their Fuels and Lubricants Research Committee.

*Prof. F. Morton*

**Professor Frank Morton,** Ph.D., D.Sc.(Tech.), F.R.I.C., M.I.Chem.E., has served as a vice-president on two previous occasions (1950–3; 1954–7) since his first election to the Council in 1947.

In 1936 he joined Trinidad Leaseholds Ltd in Trinidad as a research chemist and four years later was appointed superintendent of research and development. In 1945 he was made chief chemist to the Company and returned to England. This position he occupied until he was appointed professor of Chemical Engineering at Birmingham University. In 1956 he was invited by Manchester University to become the first professor of Chemical Engineering and head of the Department of Chemical Engineering, Fuel Technology, and Metallurgy in the College of Science and Technology, a post which he took up in April 1956.

*J. S. Parker*

**J. S. Parker,** M.A., B.Sc., a member of Council since 1945, has also served a previous period as a vice-president—1949–52—and is at present manager of Lobitos Oilfields Ltd, Ellesmere Port refinery. He has been particularly active in the formation of IP Branches having been concerned with the formation of the Trinidad, Northern, and Stanlow Branches. Of all of these he was a founder member and a committee member, twice being chairman at Stanlow.

*C. S. Newey*

**C. S. Newey** graduated with 1st Class Honours in the Department of Oil Engineering & Refining, Birmingham University, in 1936. He was awarded the Institute's Exhibition for the year 1935/1936 and in the latter year also gained the Institute's Student's prize and medal. After serving with the Royal Dutch Shell group in Rumania, Holland, and Venezuela and also in the London Office of the Burmah Oil Company, he joined his present employers, British Petroleum Company Ltd, in 1944. After a period in the mechanical engineering section, he has subsequently held the posts of manager, Steam and Power Branch and project manager Grangemouth Refinery and British Hydrocarbon Chemicals. He is now superintending engineer, Continental Division, Refineries Department, British Petroleum Co. Ltd.

*W. M. Catchpole*

**W. M. Catchpole**, M.A., who was educated at Radley College and Caius College, Cambridge and who is now chief research chemist and in charge of the British Petroleum Company's Research Station at Sunbury, entered the petroleum industry at that Research Station in 1933 when he joined the then Anglo-Persian Oil Company Ltd. Two years later he went to Persia and remained there until 1946 being, during the last three years of that period, the chief chemist of Abadan Refinery. On his return to the U.K. he joined the Process Development Branch of the Company in 1947 and at the end of 1953 was appointed to his present position. He has been a member of the Institute since 1935 and at present serves on the Institute's Research Committee.

*Council*

To fill twelve vacancies on the Council a ballot was held and the following were declared elected as the result:

Retiring vice-presidents re-elected to Council:
E. B. Evans, M.Sc., Ph.D., F.R.I.C.
A. C. Hartley, C.B.E., M.I.C.E., Hon.M.I.Mech.E.
E. J. Sturgess, C.B.E., B.Sc., A.M.I.Mech.E.

Retiring members of Council re-elected:
V. Biske, B.Sc., LL.M., F.R.I.C.
E. J. Dunstan, M.Sc., M.I.Chem.E.
F. L. Garton, M.A., B.Sc., A.F.R.Ae.S.
A. J. Goodfellow, B.Sc., A.R.I.C.
E. C. Masterson, B.Sc.
T. W. Mathias, O.B.E., M.A.
W. H. Thomas, A.R.S.M., F.R.I.C.

New nominations:
W. M. Catchpole, M.A.
C. S. Newey, B.Sc., A.M.I.Mech.E., A.M.I.E.E.

# Personal Notes

Congratulations to **L. T. Jordan,** F.Inst.Pet. on the recent conferment upon him by Her Majesty the Queen of the Honorary Commandership of the British Empire. Mr Jordan, who has been joint manager of the Kuwait Oil Company for the last ten years, was originally with the Gulf Oil Company as a petroleum engineer and served in Venezuela for 15 years before going to Kuwait in 1948.

**Geo. E. Mapstone,** M.Sc., F.Inst.Pet., has recently joined Dermacult (S.A.) Pty Ltd, of South Africa, as factory manager. Previously he was with the South African Torbanite Mining & Refining Co. Ltd, after having been for a number of years with National Oil Pty Ltd, at Glen Davis, New South Wales.

**Sir Norman Hulbert,** M.P., has joined the board of Petrofina (Gt Britain) Ltd.

**Loren F. Kahle** has been appointed transportation co-ordinator of Standard Oil Co. (New Jersey), in succession to J. J. Winterbottom, who was recently elected a vice-president and director of Esso Standard Oil Co. **J. M. B. Howard,** assistant transportation co-ordinator, has been appointed deputy co-ordinator.

*Capt H. I. McMichael, O.B.E.*

Captain **Hugh Ingersol McMichael,** O.B.E., has been appointed Commodore of BP Tanker Company Ltd (the main shipping organization of The British Petroleum Company Limited) in succession to Commodore S. D. Bumstead, O.B.E. who has retired after 37 years' service.

Captain McMichael joined BP Tanker Company as a 3rd officer in 1920. He was promoted master in 1932 and appointed a senior post master in 1952.

During the last war Captain McMichael was for over two years in command of one of the merchant aircraft carriers attached to the Company's fleet. He was appointed an officer of the Order of the British Empire in June 1954 and also holds the Queen's Coronation Medal.

Captain McMichael has been in command of supertankers since 1955, his present ship being the 32,000 dw-tons *British Courage*.

*E. H. P. Bancroft*

**E. H. P. Bancroft,** for the past 8 years advertising manager of Mobil, has been appointed manager of the retail fuels and lubricants department, in succession to T. R. C. Tompkins, who has retired after 45 years' service.

Mr Bancroft, who joined the Company in 1930, will be responsible for formulating policy on sales of all products for the motorist and of "Mobiland" for the agricultural market. He will also be responsible for retail training and the design of service stations and, through the chief automotive engineer, C. G. Tresidder, for the correct application of the Company's automotive products.

**D. M. Mackintosh** has been appointed manager of the advertising department in succession to Mr Bancroft. Mr Mackintosh joined the Company in 1936 and, prior to leaving for war service, worked as a member of the competitions division but, on his return in 1946, he joined the Company's London branch accounting division and moved to the advertising department in 1947.

*D. M. Mackintosh*

*F. R. Squires*

**F. R. Squires,** A.S.A.A., M.Inst. Pet., has been appointed manager of retail divisions of the Mobil Oil Co. from 28 April. He will co-ordinate the marketing operations of these divisions, whose offices are in London, Newcastle, Birmingham, Sheffield, and Bristol. Together with E. H. P. Bancroft, manager of retail fuels and lubricants department, Mr Squires will be responsible for marketing all products in the automotive and agricultural markets.

After rejoining Mobil in 1947 Mr Squires became chief accountant in 1948 and in 1952 he created the newly-formed distribution department.

**H. E. Richardson,** A.M.Inst.Pet., formerly assistant manager of lubricants department, Shell-Mex and B.P. Ltd, has been appointed group manager, northern, with the National Benzole Co. Ltd.

**Sir Leonard Sinclair,** M.Inst.Pet., chairman of Esso Petroleum Co. Ltd, has relinquished his position as director of Esso's Irish subsidiary, Esso Petroleum Co. (Ireland) Ltd.

**A. Peck** has been appointed manager of Mobil's distribution department and **N. P. Huntley** has succeeded him as manager of consumer fuels department.

Mr Peck, who joined the Company in 1946, spent his first 3 years as a special representative in Manchester and Sheffield Branches and then was branch sales manager in Cardiff. In 1955 he became assistant to the industrial sales manager and in 1956 was appointed manager of consumer fuels department.

*A. Peck*

*N. P. Huntley*

Mr Huntley joined the Company in 1951 and became a representative in the London area. In 1955 he was appointed a retail training instructor and in 1956 became assistant to manager of consumer fuels department.

*J. R. Wall*

**J. R. Wall,** A.M.I.Mech.E., divisional lubricants supervisor, Eastern Division, Shell-Mex and B.P. Ltd, has been made an assistant manager in lubricants department, head office.

*T. C. Bailey*

The Institute of Fuel has elected **T. C. Bailey** M.Inst.Pet., President in October of this year. This will be only the second time that a member of the oil industry has occupied this office, the previous "oilman" president being Lord Cadman, who was president in 1935–1936.

Mr Bailey's career has been spent in the marketing side of the oil industry. He first entered the fuel oil department of the Anglo-Mexican Petroleum Co., transferring in 1921 to Shell-Mex Ltd on the amalgamation of the Shell and Mexican interests, and then to Shell-Mex and B.P. Ltd on the further amalgamation with The British Petroleum Co. Ltd in 1932.

For many years he devoted his attention to the application of fuel oil to industrial furnaces and during world war II was seconded to the Petroleum Board to play a leading part in developing the use of creosote pitch mixtures as fuel. After the war he was closely concerned with the development of oil-fired open hearth steel furnaces. In 1954 he was appointed sales manager (industrial fuels) of Shell-Mex and B.P. Ltd.

# *Decline in U.K. Oil Consumption in 1957*

Last year consumption of oil products in the United Kingdom, excluding foreign bunkers, totalled 24,736,541 tons—1·9 per cent below that for 1956—according to details published by Petroleum Information Bureau. This was the first occasion since 1946 when demand was below that for the previous year, and the fall was more than accounted for by the reduction in the use of oil during the first half of the year, when rationing and other restrictions on consumption resulting from the Suez crisis were in force. Over the second six months, demand was generally at a higher level than in the latter half of 1956.

TABLE I

U.K. DELIVERIES INTO INLAND CONSUMPTION OF PETROLEUM PRODUCTS

(in tons)

| | 1957 | | 1956 | |
|---|---|---|---|---|
| Aviation fuels ... | | 1,581,779 | | 1,753,996 |
| Motor spirit (incl. motor benzole) ... | | | | |
| Dealers: | | | | |
| Premier grades | 2,811,794 | | 2,929,191 | |
| Standard grades | 1,487,581 | | 1,541,070 | |
| Commercial consumers: | | | | |
| Premier grades | 274,436 | | 336,289 | |
| Standard grades | 1,171,218 | | 1,517,104 | |
| | | 5,745,029 | | 6,323,654 |
| Industrial spirits (incl. industrial benzole) | | 170,986 | | 148,071 |
| White spirit ... | | 148,653 | | 155,593 |
| Kerosine: | | | | |
| Burning oil ... | 795,432 | | 830,808 | |
| Vaporizing oil ... | 519,469 | | 574,175 | |
| | | 1,314,901 | | 1,404,983 |
| Derv fuel ... ... | | 1,795,154 | | 1,797,139 |
| Gas, diesel, and fuel oils: | | | | |
| Gas/diesel oil ... | 2,341,362 | | 2,387,490 | |
| Fuel oil ... ... | 6,930,713 | | 6,471,209 | |
| Refinery consumption ... ... | 2,116,677 | | 2,157,170 | |
| | | 11,388,752 | | 11,015,869 |
| Lubricating oils and greases ... | | 826,496 | | 894,499 |
| Paraffin wax and scale ... ... | | 48,793 | | 52,335 |
| Propane and butane | | 73,011 | | 68,395 |
| Bitumen ... ... | | 848,389 | | 940,934 |
| Other products ... | | 794,598 | | 667,581 |
| TOTAL ... | | 24,736,541 | | 25,223,049 |

With regard to individual products, fuel oil deliveries—excluding those for refinery consumption—were 6,930,713 tons or 7·1 per cent up on the year before. Gas/diesel deliveries, at 2,341,362 tons, were lower by 1·9 per cent than in 1956, although in the second half of the year sales were higher than in July–December 1956.

Other major products showed declines, motor fuels being particularly affected by the rationing during the early part of the year and also by the additional emergency duty that was levied prior to the 1957 Budget. Over the full year, deliveries of motor spirit were 5,745,029 tons—*i.e.*, only a little above the level achieved in 1953, four years earlier—representing a decline of 9·2 per cent over 1956; in the final quarter of last year, however, there was a fractional increase over the fourth quarter of the year before. Premier grades accounted for 3,086,230 tons (nearly 54 per cent of total deliveries) and standard grades comprised the remaining 2,658,799 tons.

Consumption of derv fuel was 1,795,154 tons (only 2000 tons below that for 1956) and the fourth quarter showed a gain of 2.3 per cent over the same period in the preceding year. Deliveries of burning oil (795,432 tons) were 4.3 per cent down on the year; those of vaporizing oil (519,469 tons), aviation fuels (1,581,779 tons), lubricating oils (826,496 tons), and bitumen (848,389 tons) were also lower than a year before.

In contrast to the general picture, there was a 19 per cent increase in deliveries of "other products"—totalling 794,598 tons—which was largely associated with the rapidly expanding use of oil as feedstock in the manufacture of chemicals.

Deliveries into inland consumption of petroleum products for 1957 and 1956 are given in Table I, which shows that increased deliveries were made of industrial spirits and there was also a rise in gas, diesel, and fuel oils. Deliveries of propane and butane rose by some 3000 tons.

### End Uses

Details of end uses of certain products are set out in Tables II and V. The former covers motor fuels and kerosine. Although there was a general decline in both gasoline and derv consumed, goods vehicles accounted for a greater share than in 1956, with 928,000 tons compared with 907,000 tons. In Table V total consumption of gas/diesel and fuel oils for central heating increased but the proportion provided by private heating dropped.

One of the most striking features was the enormous rise in use for the raising of steam in public electricity stations. Nearly 300,000 tons more were used in 1957 than in 1956. Use by the railways for traction also more than doubled in the past twelve months.

TABLE II

UNITED KINGDOM

ESTIMATED END USE OF CERTAIN PETROLEUM PRODUCTS

(in thousand tons)

| | 1957 | 1956 |
|---|---|---|
| *Motor spirit:* | | |
| Cars and motor cycles | 3,040 | 3,140 |
| Taxis | 35 | 50 |
| Public service vehicles | 100 | 120 |
| Goods vehicles | 1,830 | 2,200 |
| Industrial use | 200 | 190 |
| Agricultural use (incl. agricultural vans) | 220 | 245 |
| Services and other Government | 275 | 325 |
| Petroleum industry own use | 21 | 27 |
| Miscellaneous | 24 | 27 |
| | 5,745 | 6,324 |
| *Derv fuel:* | | |
| Public service vehicles | 820 | 845 |
| Goods vehicles | 928 | 907 |
| Petroleum industry own use | 29 | 24 |
| Miscellaneous | 18 | 21 |
| | 1,795 | 1,797 |
| *Burning oil:* | | |
| Farming | 18 | 20 |
| Industrial and railways | 48 | 49 |
| Services and other Government | 51 | 51 |
| Domestic heating, lighting, and cooking | 678 | 711 |
| | 795 | 831 |
| *Vaporizing oil:* | | |
| Agricultural tractors | 486 | 535 |
| Agricultural stationary engines | 11 | 14 |
| Fishing | 7 | 8 |
| Industrial | 15 | 17 |
| | 519 | 574 |
| *Lubricating oils and greases:* | | |
| Aviation | 12 | 12 |
| Industrial | 470 | 491 |
| Marine | 71 | 68 |
| Motor | 238 | 277 |
| Tractor | 35 | 46 |
| | 826 | 894 |

TABLE III

UNITED KINGDOM

INDIGENOUS MATERIALS MADE AVAILABLE FOR DISTRIBUTION BY THE PETROLEUM INDUSTRY

(EXCL. SHALE AND INDIGENOUS CRUDE)

(in tons)

| | 1957 | 1956 |
|---|---|---|
| Motor spirit (by low-temperature carbonization) | 5,608 | 3,633 |
| Motor and aviation spirit (by hydrogenation) | 74,652 | 84,114 |
| Refined benzole | 324,639 | 314,489 |

TABLE IV

UNITED KINGDOM

PRODUCTION OF PETROLEUM PRODUCTS EX IMPORTED AND INDIGENOUS CRUDE AND PROCESS OILS (incl. SHALE)

(in tons)

| | 1957 | 1956 |
|---|---|---|
| Motor and aviation spirit | 5,908,161 | 6,771,195 |
| Industrial spirits | 1,968 | 2,291 |
| White spirit | 138,613 | 133,926 |
| Burning oil | 715,342 | 771,330 |
| Vaporizing oil | 124,210 | 98,037 |
| Gas/diesel oil | 5,066,524 | 5,188,849 |
| Fuel oil | 10,466,598 | 10,394,848 |
| Refinery fuel consumption (ex own production) | 2,090,962 | 2,130,906 |
| Bitumen | 812,825 | 933,432 |
| Paraffin wax, scale, and slack wax | 28,144 | 19,326 |
| Lubricating oil | 742,892 | 776,385 |
| Propane and butane | 71,895 | 66,260 |
| Miscellaneous products and loss | 1,650,283 | 1,394,478 |
| TOTAL | 27,818,417 | 28,681,263 |

TABLE V

UNITED KINGDOM

INLAND END USE OF GAS OIL, DIESEL OIL, AND FUEL OIL

(in thousand tons)

| | 1957 | | | 1956 |
|---|---|---|---|---|
| | *Gas/diesel* | *Fuel oil* | *Total* | *Total* |
| *Burning:* | | | | |
| Central heating: | | | | |
| Private | 83·9 | 6·1 | 90·0 | 94·4 |
| Other | 202·4 | 1,005·5 | 1,207·9 | 1,080·9 |
| Bakeries | 22·5 | 81·9 | 104·4 | 107·2 |
| Glass | 23·3 | 190·1 | 213·4 | 261·7 |
| Ceramics | 9·8 | 91·8 | 101·6 | 89·8 |
| Steel: | | | | |
| Open hearth | 0·3 | 1,060·5 | 1,060·8 | 1,067·0 |
| Other | 59·0 | 500·3 | 559·3 | 605·8 |
| Industrial furnaces: | | | | |
| Metallurgical | 49·3 | 291·2 | 340·5 | 376·0 |
| Other | 86·9 | 230·5 | 317·4 | 275·4 |
| Agricultural driers | 32·9 | 29·6 | 62·5 | 72·7 |
| Steam raising: | | | | |
| Public electricity | 10·4 | 631·8 | 642·2 | 358·6 |
| Other | 51·5 | 1,886·5 | 1,938·0 | 1,826·1 |
| *Power:* | | | | |
| Agricultural units | 376·7 | 0·2 | 376·9 | 360·2 |
| Marine craft | 214·3 | 646·6 | 860·9 | 790·1 |
| Rail traction: | | | | |
| Railways | 42·5 | 1·4 | 43·9 | 18·2 |
| Industrial | 18·1 | — | 18·1 | 21·5 |
| Stationary engines: | | | | |
| Public electricity | 38·3 | 16·9 | 55·2 | 60·7 |
| Other | 280·6 | 3·9 | 284·5 | 327·4 |
| Mobile diesels | 298·1 | 14·0 | 312·1 | 346·1 |
| *Manufacture:* | | | | |
| Gasmaking | 392·7 | 52·8 | 445·5 | 462·6 |
| Other | 29·0 | 31·5 | 60·5 | 82·7 |
| Refineries* | — | 2,116·7 | 2,116·7 | 2,157·2 |
| Petroleum industry | 18·8 | 157·6 | 176·4 | 173·5 |
| TOTAL | 2,341·3 | 9,047·4 | 11,388·7 | 11,015·8 |

*Including ex own production.

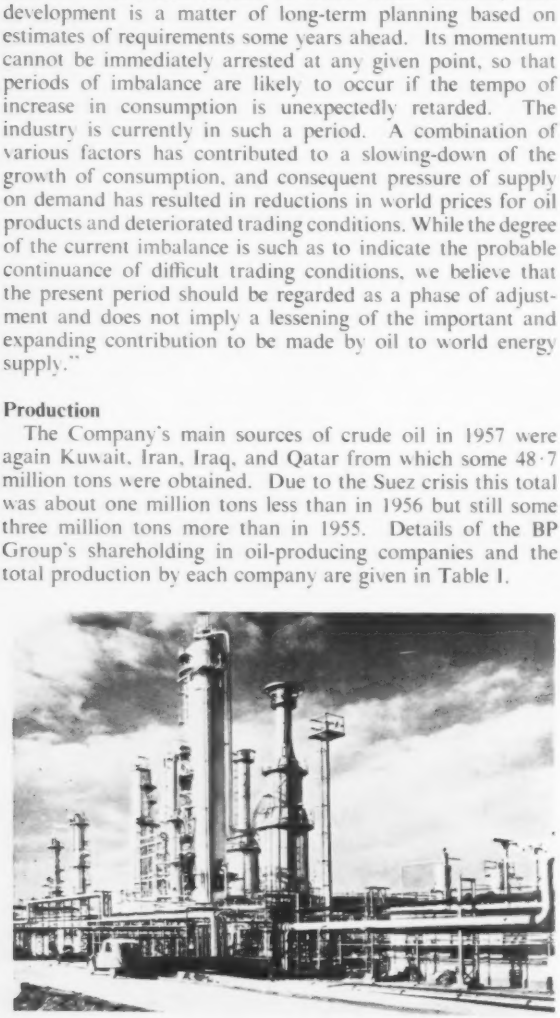
# *British Petroleum Company's 1957 Operations*

Sir Neville Gass, K.B.E., M.C., chairman of The British Petroleum Company Ltd, in his statement covering the year 1957, said:

"The international oil industry has in recent years been heavily engaged in expanding its facilities for production, refining, transportation, and delivery to keep pace with continual and substantial increases in consumers' requirements. Because of the time needed to create these facilities, such development is a matter of long-term planning based on estimates of requirements some years ahead. Its momentum cannot be immediately arrested at any given point, so that periods of imbalance are likely to occur if the tempo of increase in consumption is unexpectedly retarded. The industry is currently in such a period. A combination of various factors has contributed to a slowing-down of the growth of consumption, and consequent pressure of supply on demand has resulted in reductions in world prices for oil products and deteriorated trading conditions. While the degree of the current imbalance is such as to indicate the probable continuance of difficult trading conditions, we believe that the present period should be regarded as a phase of adjustment and does not imply a lessening of the important and expanding contribution to be made by oil to world energy supply."

**Production**

The Company's main sources of crude oil in 1957 were again Kuwait, Iran, Iraq, and Qatar from which some 48·7 million tons were obtained. Due to the Suez crisis this total was about one million tons less than in 1956 but still some three million tons more than in 1955. Details of the BP Group's shareholding in oil-producing companies and the total production by each company are given in Table I.



*This new 2·2 million tons per year distillation unit at BP's Lavera refinery brings its total capacity up to 4 million tons*

**Exploration**

In Papua two wells were completed and two more begun and the continuance of this enterprise will depend on the results obtained from these wells. One well was drilled in Queensland and geological work continued in other parts of Australia and in New Zealand.

A deep test is being drilled at Mandawa in East Africa and the prospects of commercial production in Nigeria were enhanced by two further discoveries.

Geological and geophysical work was carried out in many other countries and an exploration permit covering 1800 acres in the Touggourt area of the Algerian Sahara was granted in February 1958. The well which Abu Dhabi Marine Areas Ltd are drilling offshore in the Persian Gulf had reached a depth of 5800 ft by 14 April 1958.

**Refining**

In spite of the dislocation of crude oil supplies caused by the Suez crisis the total throughput of BP refineries for 1957 was 32·1 million tons, only slightly less than for 1956. Details are given in Table II.

TABLE I

| *Company* | *BP Group shareholding per cent* | *Total crude oil production* 1957 *Tons* | 1956 *Tons* |
|---|---|---|---|
| KUWAIT | | | |
| Kuwait Oil Company Ltd... | 50 | 56,376,000 | 54,117,000 |
| IRAN | | | |
| Iraanse Aardolie Exploratie en Productie Maatschappij N.V. (through Iranian Oil Participants Ltd) ... | 40 | 34,765,000 | 25,934,000 |
| IRAQ | | | |
| Iraq Petroleum Company Ltd ... ... ... | 23½ | 11,657,000 | 21,086,000 |
| Basrah Petroleum Co. Ltd.... | 23¾ | 9,140,000 | 8,439,000 |
| Mosul Petroleum Co. Ltd.... | 23¾ | 564,000 | 1,078,000 |
| QATAR | | | |
| Qatar Petroleum Company Ltd ... ... ... | 23¾ | 6,505,000 | 5,784,000 |
| TRINIDAD | | | |
| Trinidad Petroleum Development Co. Ltd ... ... | 77 | 637,000 | 600,000 |
| Trinidad Northern Areas Ltd ... ... ... | 33⅓ | 140,000 | 76,000 |
| UNITED KINGDOM | | | |
| BP Exploration Co. Ltd.... | 100 | 82,000 | 66,000 |
| Scottish Oils Ltd (Shale Oil) | 100 | 71,100 | 77,600 |
| CANADA | | | |
| Triad Oil Co. Ltd ... ... | 42 | 94,000 | 77,000 |
| GERMANY | | | |
| Gerwerkschaft Norddeutschland ... ... ... | 100 | 3,900 | 2,800 |

TABLE II

| Company | Refinery location | BP Group shareholding per cent | Total throughput 1957 Tons | Total throughput 1956 Tons |
|---|---|---|---|---|
| UNITED KINGDOM | | | | |
| BP Refinery (Grangemouth) Ltd ... ... ... | Grangemouth | 100 | 1,881,000 | 2,152,000 |
| BP Refinery (Kent) Ltd ... | Isle of Grain | 100 | 3,275,000 | 3,854,000 |
| BP Refinery (Llandarcy) Ltd | Llandarcy | 100 | 2,311,000 | 2,777,000 |
| Scottish Oils Ltd ... ... | Pumpherston | 100 | 151,000 | 143,000 |
| ADEN | | | | |
| BP Refinery (Aden) Ltd ... | Aden | 100 | 4,240,000 | 4,615,000 |
| AUSTRALIA | | | | |
| BP Refinery (Kwinana) Ltd | Kwinana | 100 | 2,287,000 | 2,304,000 |
| BELGIUM | | | | |
| Société Industrielle Belge des Pétroles S.A. ... ... | Antwerp | 50 | 2,574,000 | 2,595,000 |
| FRANCE | | | | |
| Société Française des Pétroles BP, S.A. ... | Dunkirk | 70 | 1,677,000 | 1,948,000 |
| | Lavera | 70 | 1,900,000 | 2,229,000 |
| GERMANY | | | | |
| BP Benzin und Petroleum A.G. ... ... ... | Hamburg | 100 | 1,266,000 | 1,447,000 |
| Oelwerke Julius Schindler G.m.b.H. ... ... ... | Hamburg | 97 | 165,000 | 245,000 |
| IRAN | | | | |
| Iraanse Aardolie Raffinage Maatschappij N.V. (through Iranian Oil Participants Ltd) ... ... | Abadan | 40 | 5,202,000 | 11,227,000 |
| ISRAEL | | | | |
| Consolidated Refineries Ltd | Haifa | 50 | 1,052,000 | 975,000 |
| ITALY | | | | |
| Industria Raffinazione Oli Minerali, S.p.A. ... | Venice | 49 | 1,370,000 | 1,564,000 |
| KUWAIT | | | | |
| Kuwait Oil Company Ltd... | Kuwait | 50 | 1,352,000 | 1,427,000 |
| LEBANON | | | | |
| Iraq Petroleum Company Ltd | Tripoli | 23¼ | 495,000 | 505,000 |

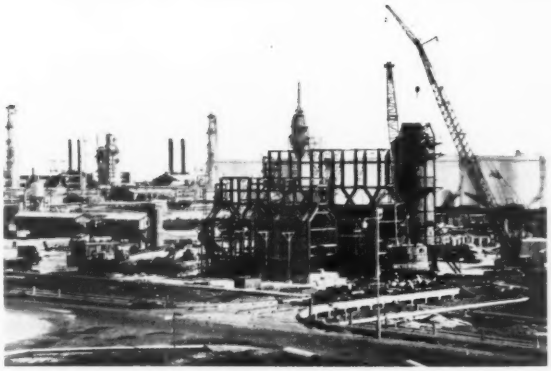
**Petroleum Chemicals**

Major expansions in the Group's activities in this field took place during 1957. The three companies in the U.K. in which BP participates all maintained high outputs. British Hydrocarbon Chemicals Ltd is constructing plant for the production of phenol and acetone by the Distillers Company process, and have a plant under construction for making linear polyethylene by the Phillips low-pressure catalytic process. An expansion of ethylene production is also being considered.

When these expansions are completed the production of chemicals at Grangemouth will approach 200,000 tons per annum. In addition Gemec Ltd, a subsidiary of Union Carbide Ltd, has commissioned a plant to produce 12,000 tons per year of polyethylene from ethylene purchased from B.H.C.

In France the cracking plant of Naphtachimie, in which Soc. Française des Pétroles BP has a substantial holding, was enlarged and ethylene production increased from 10,000 to 18,000 tons per annum. The production of polyethylene by the Ziegler process will start shortly and ethylene production capacity will be raised to 48,000 tons per annum. Total chemical production is then expected to reach 80,000 tons annually.

In Germany, Erdölchemie G.m.b.H. has been formed jointly by BP Benzin und Petroleum A.G. and Farbenfabriken Bayer to manufacture petroleum chemicals. The site of the operations will be at Dormagen, near Cologne, and about 250,000 tons annually of petroleum feedstock will be required. This will be supplied from the new BP refinery to be built in the Ruhr.



*A catalytic reformer with a throughput of* 10,000 *barrels a day is being erected at BP's Kwinana refinery at a cost of approximately* £A4 *million. This view shows the work in progress with the distillation plant and catalytic cracker in the background*

**Sea Transport**

The BP Tanker Company's fleet is now 133 ships of 1,920,000 dw tons compared with 143 and 2,016,000 dw tons a year ago. Operation of part of the fleet is, in the interests of administrative efficiency, being transferred to BP Clyde Tanker Co. Ltd and seven vessels have already been transferred. The present position is:

| | *Ships* | *dw tons* |
|---|---|---|
| BP Tanker Co. Ltd ... ... | 133 | 1,920,000 |
| BP Clyde Tanker Co. Ltd ... | 7 | 90,000 |
| Tanker Charter Co. Ltd ... | 9 | 255,000 |

There are 55 vessels under construction or on order comprising 7 of 65,000 dw tons each, 12 of 50,000 dw tons, 7 of 42,000 dw tons, 15 of 34,500 dw tons, and 14 of 15,500 dw tons.

Soc. Maritime des Pétroles BP has 10 ships totalling 209,000 dw tons, and has on order 1 of 33,000 dw tons, 2 of 47,000 dw tons each, and 1 of 68,500 dw tons.

The ten 16,000 dw ton ships of The Lowland Tanker Co., in which BP has a 50 per cent interest, will be joined in 1960/61 by five others each of about 19,000 dw tons.

**Sales**

BP sales of crude oil and products in 1957 were approximately 53 million tons, as in 1956; a reduction in the first half of the year, due to Suez, was made good in the second half of the year.

**Capital Expenditure**

Total capital expenditure during 1957 was £100·5 million compared with £86 million in 1956, details being:

| | 1957 £ | 1956 £ |
|---|---|---|
| Exploration and production | 23,250,000 | 21,750,000 |
| Refineries ... ... ... | 38,500,000 | 22,000,000 |
| Tankers ... ... ... | 9,250,000 | 12,750,000 |
| Distribution and marketing facilities ... ... ... | 30,500,000 | 29,500,000 |

# Notes of the Month

**ASTM Committee D-2 on Petroleum Products and Lubricants**

The annual February meeting of the ASTM committee D-2 on petroleum products and lubricants was highlighted by two symposia—one on aircraft applications of hydraulic fluids, and the other on bulk quantity measurements.

The committee also participated in a programme on cotton improvement arranged by the Southwest District. Papers were presented on the cotton improvement programme in the United States, the instruments used in testing and evaluating cotton, American cotton's position in world commerce, "Fibres, fabrics, fashion's future", "Chemical finishing of cotton", and "Man-made fibres".

At a dinner sponsored by the Southwest District and committee D-2, the speaker was H. W. Ferguson, vice-president of Humble Oil and Refining Co. Other speeches were by the ASTM president, Professor Kropf, the ASTM executive secretary, R. J. Painter, and the secretary of committee D-2, W. T. Gunn.

A "Proposed method for knock characteristics of motor fuels above 100 by the research method" was submitted to the Society for publication as information. It was prepared jointly by technical committee A on gasoline and the division of combustion. This method will be reviewed and revised annually until it is ready for publication as tentative. The specifications for motor gasoline (D 439) will be revised at the annual meeting in June based on the 1957–58 Bureau of Mines survey. This will affect the octane number requirements.

The technical committee on burner fuel oils has been reorganized for a more active programme of work on (1) light fuel oils, (2) heavy fuel oils, (3) combustion tests, and (4) pumpability tests.

Butadiene measurement tables have been recommended for publication as tentative by the technical committee on aromatic hydrocarbons. A report giving a brief résumé of data and information on which the tables are based was also presented for publication.

A symposium on applications of hydraulic fluids was sponsored by technical committee N. Two papers were presented; one covered "measurement of bulk modulus of hydraulic fluids" and the other "Evaluating magnetic filters".

The committee is planning to sponsor a symposium on hydraulic fluids at the Third Pacific Area National Meeting of ASTM on 11–16 October 1959, in San Francisco. It also has five co-operative flammability tests being carried on by twenty-two laboratories. A series of reference fluids will be subjected to the various flammability tests used by the participating laboratories. This will permit an analysis of the different procedures with regard to their applicability to the different fluids, the significance of the results obtained, and the relative ease of operation, simplicity, repeatability, etc. Such an analysis will suggest the factors or operating conditions that should be incorporated into a standardized flammability method.

A symposium of five papers on bulk quantity measurements was also held in February, under the sponsorship of research division II on measurement and sampling. The papers covered the use of devices for automatic sampling of petroleum and petroleum products.

The Standard Method of Test for flash point by means of the Pensky-Martens closed tester (D 93-52) was revised and reverted to tentative. The apparatus is being covered by separate specifications prepared by committee E-1 on methods of testing.

**Jersey Standard in 1957**

Gross revenues, production, and sales volume of petroleum products in 1957 were the highest ever achieved by Standard Oil Company (New Jersey) and its affiliated companies. Although events in the last six months adversely affected earnings, results for the year were close to the record amount earned in 1956. Consolidated earnings were $805 million, or $4·08 per share, slightly less than the all-time record of $809 million, or $4·11 per share earned in 1956.

Product sales volume rose slightly from 2,607,000 b.d. in 1956 to 2,621,000 b.d. in 1957. Gross crude oil production was at a new peak of 2,389,000 b.d. in 1957 compared with 2,322,000 b.d. in 1956. Crude oil runs to refineries declined slightly from 2,447,000 b.d. in 1956 to 2,427,000 b.d.

Jersey Standard affiliates invested $1,376,965,000, the largest sum in the company's history for property, plant, and equipment and in the search for oil and gas. This sum compares with $1,083,000,000 spent for these purposes in 1956.

Income and operating taxes, together with import duties, consumer taxes, and other payments to the United States and foreign governments, totalled $2,300,400,000 in 1957, compared with $2,171,400,000 in 1956. These payments to governments were equivalent to $11·66 per share in 1957—more than five times the dividend payments to shareholders and more than double the employee payroll and benefit costs for the year.

Jersey affiliate expenditures for research rose to $55,500,000 in 1957 from $44,000,000 in 1956 and staff engaged in research increased from 2930 in 1956 to 3370 last year. Significant research advances were made in the fields of oil exploration and production as well as in the petrochemical and refining methods fields.

A BP photograph

*The first crude oil from Nigeria reached the U.K. on* 31 *March and, in a ceremony on board the tanker* Clyde Crusader *of the BP Tanker Co., M.T. Mbu opened the valve to begin discharge of the cargo of* 7000 *tons of oil. Mr Mbu is seen opening the valve, watched by* (left) *Captain C. Spark and* (right) *A. E. C. Drake, O.B.E., a director of BP Trading Ltd (the BP Co.'s main trading subsidiary)*

### Southampton Water Reproduced in Asphalt-Lined Tank

The University of Southampton, in conjunction with the Southampton Harbour Board, and the Caltex Group of Companies, recently announced completion of a large-scale model of Southampton Water. The model is constructed in a fine-screen concrete tank, waterproofed with a lining of mastic asphalt applied by specialists from the Southampton Office of the Limmer & Trinidad Lake Asphalt Co. Ltd.

By means of the model, scientists can reproduce in six minutes with complete accuracy the full tidal cycle of the Solent and Southampton Water. Variations in the sea bed are plotted from Admiralty charts and positioned in the model to an accuracy of 1/50 inch. The tidal flow at the Eastern and Western Solent Entrances is generated by pneumatically operated tanks, powered by electric motors. Underwater velocities are measured and checked by specially designed propellers connected to an electronic conversion unit. The model also simulates the flow of rivers emptying into the estuary.

Three hundred and forty square yards of two-coat mastic asphalt were required to waterproof the tank. Mastic asphalt ensured watertightness at the angles formed in the tank walls as they followed the mapped outline of the coast.

The model, which cost about £16,000, will be housed in a new University building, and will facilitate the research services the University can now undertake. Projected applications include: the effect of docking installations planned by the Caltex Group; research into the possibilities of contamination from industrial effluents; the solving of problems of ship handling, harbour dredging, and the planning of foreshores.

The model was produced under the direction of Dr W. Wright, Head of the Department of Civil Engineering, and Professor A. N. Black, Head of the Department of Mechanical Engineering, at Southampton University.

### Sir John Cass College Petroleum Courses

There were no major changes in the character or volume of work in any department, states the report of the Sir John Cass College for the session 1956–57, which has recently been published. Consideration, however, continued to be given to the complex problem of future arrangements for the three distinct branches of study in the departments of science, navigation, and art.

The number of students and the volume of work was greater than in the previous session and forty-seven students gained the degree of B.Sc., three being awarded first-class honours. Eleven higher degrees were also awarded.

For the 20 lectures on general technology of petroleum 236 students were enrolled, for the lectures on distribution of oil the figure was 92, and for those on fuel oils the number was 150. The lectures on scientific principles of fuel technology secured 10 enrolments.

Copies of the report can be obtained from the Sir John Cass College, Jewry Street, London, E.C.3.

### More Refinery Gas for North Thames Gas Board

An agreement has been signed between the North Thames Gas Board and Mobil Oil Co. Ltd for the supply from Coryton refinery of at least 2 million cu.ft/day of refinery gas for an initial period of nearly ten years, beginning in the middle of 1959. This supply is equivalent to the amount of gas produced from 120,000 tons of carbonization coal per year.

### New BP Service Stations in Canada

BP Canada Ltd has entered the petroleum retail market in the Province of Ontario by purchasing the seven service stations of two small companies, Sunlight Oil Co. Ltd and Barrington Petroleum Products Ltd, both of Ottawa. Through association with P. M. Fleming Ltd, of Haileybury, Ontario, the Company has also acquired more than 100 retail sale outlets in Northern Quebec and Northern Ontario.

Since BP service stations first appeared in Canada in May last year, more than 250 stations have been built or acquired in Quebec and Ontario by BP Canada Ltd. The Company is also to operate a 25,000-b.d. refinery at Montreal, on which construction is about to start.

### Refinery Supplies Udex Feed to Japanese Petrochemical Plant

The aromatic-rich product from a UOP platforming unit at the Koa Oil Company, Ltd, refinery at Marifu, Japan, is supplied direct to the adjacent plant of the Mitsui Petrochemical Industries Ltd, as part of the feedstock for a Udex unit.

The other portion of the feedstock is an aromatic co-product from the cracking of naphtha to produce ethylene, which has been hydrogenated and purified in a new 500 b.d. unifining unit recently put into operation at the Mitsui plant. The Udex unit is producing high-purity benzene, toluene, and xylenes.

The Koa platformer has a design capacity of 1800 b.d., and is processing naphtha, derived from Middle East crudes, which boil in the range of 150 to 300° F. Another platformer, which went on stream in December 1953, at the Koa refinery is operating exclusively to produce high-octane motor fuel blending component.

### Exploration in Nigeria

Two new Nigerian oil exploration wells—one the deepest yet drilled in the Federation—have proved unsuccessful.

The deepest well (12,063 ft) was at Ossiomo, some 17 miles south of Benin City, in the Western Region. It proved to be dry. The other was at Ikpe, some 35 miles north-east of Port Harcourt, in Calabar Province, in the Eastern Region. This was taken to a final depth of 8953 ft, but showed no significant oil accumulations.

A further exploration well will now be drilled in the Western Region, at Ethiope, in Delta Province. The Ikpe drilling outfit will move to Uda, 80 miles south-east of Port Harcourt, in Eket Division of Calabar Province.

At the same time, the most northern exploration well yet undertaken by Shell-BP in Nigeria is being drilled at Aiddo, in Onitsha Province, near the border between the Eastern and Northern Regions.

The first well in Nigeria to be drilled by Shell-BP's £1·3 million drilling barge, which was towed 4000 miles by sea from the Netherlands to West Africa at the end of last year, has been spudded in at a location on the river-bed opposite Bonny Town, some 40 miles from Port Harcourt.

Before drilling began, a special steel foundation was erected on the river bed to support the derrick and some of the machinery. The barge, which is specially designed for operation in areas covered by shallow water, such as the tidal mangrove swamps found along the Niger Delta, also carries a helicopter landing platform. The Bonny well is expected to be completed within three months.

### CBMPE Activities in the Second Half of 1957

Three major features of the activities of the Council of British Manufacturers of Petroleum Equipment during the last six months of 1957 are recounted in the chairman's report on the work of the Council from July to December last year. These were the propagation of the findings of the Economic, Technical, and Goodwill Mission to Canada (led by J. M. Storey, managing director, Dewrance & Co. Ltd), the publication of the 1957–58 edition of *British Petroleum Equipment*, and the interest centring on the preparations for the Chemical and Petroleum Engineering Exhibition to be held this June at Olympia.

The CBMPE is ready to help in every possible way in the energetic follow-up action projected subsequent to the Storey mission. Its report on the mission was hailed as a "model" of its kind.

The new edition of *British Petroleum Equipment*, which was reviewed in the October issue of the IP *Review*, contains details of equipment supplied by over 370 firms.

When stand bookings for the Chemical and Petroleum Engineering Exhibition closed, some 250 exhibitors had been accommodated in about 125,000 sq. ft of display space.

In Europe, during the period considered, the FEPEM promoted a visit to study the distribution and utilization of natural gas in the Po Valley, and held its second international conference at Stuttgart. The latter was fully covered in the IP *Review* for January 1958.

During the six months two new features in the field of publications were introduced by CBMPE. Suppliers' Guide Surveys were inaugurated, the first issues dealing respectively with pipeline operating companies and pipeline contractors in countries outside the U.S.A., Canada, and Russia, and prospecting and established oil companies in North Africa and the Near and Far East. Secondly, market information service supplements were started to give more detailed news of contracts placed, staff or agency representation offers, vacant production capacity, etc.

The consultant's report on the Council's technical work makes some interesting forecasts, amongst which are the following. Dealing with the U.S.A., it is stated that trends indicated by estimates for 1958 are (compared with 1957) a 1·5 per cent drop in crude production, a 1·9 per cent drop in imports, no change in total demand, and a 2·5 per cent increase in domestic consumption. Refinery building activity was greater in countries outside the U.S.A. Trends in Canada were expected to approximate to those in the U.S.A. In Canada natural gas and LPG have become available (natural gas is expected to be delivered to Montreal during the course of the year) and have affected the offtake of liquid fuel products from the refineries. Big capital schemes are likely to advance considerably and the St Lawrence Seaway project has been ahead of programme.

In all European countries capital expenditure is active and no let-up during the year is anticipated. The work in hand includes pipelines and new refineries.

The CBMPE continued to be represented on technical committee work on formulation of new, and revision of existing, British Standards.

Membership of the Council, compared with the figure for the end of December 1956 had, in February 1958, risen by 16 to a total of 439.

The report, which also contains a classified list of enquiries received, the values of equipment orders, a calendar of Council activities, and the composition of the Storey mission, is available from CBMPE, 2 Princes Row, Buckingham Palace Road, London, S.W.1.

### Completion of Nigerian Pipeline

Oil is now being pumped through the recently completed Oloibiri-Port Harcourt pipeline in the Eastern Region of Nigeria.

Started in April 1957, the 70-mile pipeline makes eight river and creek crossings and nine miles only of the route is along made-up roads. The pipeline was constructed in two stages. First, the seven-mile stretch of 8-inch diameter line between Oloibiri and Kugbo Creek was completed in December last to enable oil to be loaded on to barges at the Creek for transport by water to Port Harcourt. The second, and main part of the line is of 10-inch diameter.

During the period when production from Oloibiri was being evacuated by barge, output from the field was limited to the capacity of the barge traffic, approximately 70 tons a day. Now production from Oloibiri is expected to be about 700 tons a day.

Including the output from the wells at Afam, which is situated 25 miles north-east of Port Harcourt, the total exports of oil from Nigeria should shortly reach a level of 1000 tons a day.

A small but encouraging show of oil has recently been encountered in an exploration well completed by Shell-BP at Ituk, in Calabar Province, 65 miles east of Port Harcourt. Further drilling will be necessary before the significance of the find can be assessed.

Drilling in the area was originally started in 1956, but in August of that year it had to be suspended due to technical difficulties. Equipment to overcome these did not become available until September 1957, when drilling was resumed and the well was completed a couple of months later. Then the main rig was moved to drill an exploration well at Ikpe, 35 miles north-east of Port Harcourt, and a smaller testing outfit was brought into Ituk to test the well. These tests have now been completed.

A further success in the search for oil is reported from Bomu, in Ogoni Division, 16 miles south-east of Port Harcourt. There, oil has been encountered during routine testing of an exploration well. Additional tests are now being carried out as part of the normal programme on this well.

### Careers in Oilfield Production

At the beginning of May the first party of science and engineering graduates from the University of Birmingham paid a visit to the Rochester works of Le Grand Rochester Ltd. The Company, who specialize in manufacture of equipment for oilfields in most parts of the world, is particularly interested in the problem of recruiting personnel of high technical skill and professional qualifications and has accordingly inaugurated this series of visits for graduates to show what the oil-equipment industry can offer young men seeking a career.

First of the universities to co-operate in this exercise is the School of Petroleum Production at Birmingham and the initial party of graduates who visited the works was led by Dr S. R. M. Ellis, Professor of Chemical Engineering, and H. Gilmour, B.Sc., head of the Petroleum Production School.

### Education and the Oil Industry

Nearly 250 science and mathematics teachers, drawn from the public schools, some of the larger girls schools, and the grammar and secondary schools in the Home Counties, recently assembled at University College, London, for a three-day residential course. Organized by the Shell Petroleum Company, the course aimed to show the teachers how the sciences they teach in schools are applied to a great international industry. A similar course, but limited to science teachers, was held in 1957.

The first two days were devoted to lectures and films; on the third there was a visit to Stanlow refinery and the Thornton Research Centre. Lecturers included Professors J. McG. Bruckshaw, D. J. Christopherson, O.B.E., and D. McKie, Professor H. Kramers from the Technological University of Delft, and Dr M. A. Biot from the Massachusetts Institute of Technology. One of the aims of the course was to promote discussion. By an exchange of views it was hoped to bridge the gap between education and industry and to explore the ground as to what it is possible to teach the student in school, what he needs at the university or technical college, and what industry expects of him after that.

### Japan's First Udex Unit Starts Production

The first Udex installation in Japan, at Kawasaki City, went on stream recently at the refinery of Mitsubishi Oil Company, Ltd and marked the firm's entry into the petrochemical field.

Start-up of the unit, which has a design capacity of 750 b.d., to produce benzene, toluene, and xylenes, followed by less than 2 weeks the placing into operation of a second UOP platforming unit at the Mitsubishi plant.

Installation of these facilities and a new 12,500 b.d. unifining unit is part of a programme by Mitsubishi to expand refining operations and improve product quality.

The platformer is charging naphthas from Middle East crudes on a blocked-out basis to supply feedstocks for the Udex unit and to produce a high-octane motor-fuel blending component. Modification of another platforming unit, which has been in operation since August 1954, will permit production of charging stock for the Udex installation.

The new platformer then will be used exclusively to produce motor fuel platformate. Present plans call for the modified unit to be operated on naphthas derived from a mixture of Middle East and East Indian crudes.

The unifining unit is being employed to desulphurize distillate fuels ranging from kerosine through gas oils to improve quality.

Universal Oil Products Company, Des Plaines, Ill, designed and engineered all three units and licensed them through Japan Gasoline Company, Ltd, UOP's licensing agent in Japan.

### Anglo-Ecuadorian Units Near Completion

Work is nearing completion on the construction by Procon (Great Britain) Ltd of thermal cracking and crude distillation units at the refinery of Anglo-Ecuadorian Oilfields, Ltd at La Libertad.

Construction of these units is part of an expansion programme to meet increasing demands for domestic petroleum products, particularly of gasoline.

Universal Oil Products Company, Des Plaines, Ill, did the process design on the 6000 b.d. thermal cracker and the 7700 b.d. crude unit.

### Another Esso Supertanker Launched

Another in the series of 36,040-dw ton Esso tankers was launched recently from the San Marco yard of Cantieri Riuniti dell'Adricatico, Trieste.

The vessel was named *Esso Southampton* by Mrs Dewdney, wife of D. A. C. Dewdney, a director of Esso Petroleum Company.

This new ship is the second in the Esso fleet to bear the name of Southampton, the former *Esso Southampton* having completed her useful life a short time ago. The Company was naturally anxious to retain this name in the fleet because of its long association with the town of Southampton and the location of the Esso refinery on Southampton Water.

She is the sixth vessel of eighteen in the current programme of tanker construction, which also includes the building of seven ships of 47,400 dw tons with options to increase two of these to 65,000 dw tons.

The new *Esso Southampton*, when commissioned, will be engaged in transporting crude oil from Middle Eastern ports to Fawley refinery. The vessel is 690 ft overall in length with a beam of 90 ft and will have a loaded summer draught of 35½ ft. She will have a service speed of 17 knots and will be able to discharge her cargo in less than nine hours at a rate of 4350 tons per hour through four pumps.

### Larger Executive Committee for Jersey Standard

Membership of the executive committee of Standard Oil Co. (New Jersey) has been increased from five to six by the election of Leo D. Welch. This committee acts for the board when the latter is not in session and is also available to the chief executive officer to assist in the discharge of executive duties.

Mr Welch and three other members of the committee, Hines H. Baker, L. W. Elliott, and E. E. Soubry, have also been designated executive vice-presidents. All four, previously vice-presidents, will serve with Eugene Holman, chairman, and M. J. Rathbone, president.

### BP Chairman Visits Offshore Drilling Site

*After his recent visit to Canada to view the site for the new BP refinery at Montreal, Sir Neville Gass, chairman of the British Petroleum Co., has been touring BP interests in the Middle East. In the photograph Sir Neville is seen with the Ruler of Abu Dhabi, Sheikh Shakbut bin Sultan during a luncheon given by the Ruler in his palace at Abu Dhabi*

### Nigerian Oil Pipeline

*A contribution to the first supplies of oil from Nigeria, referred to in the April* IP Review, *has been made by Taylor Woodrow (Nigeria) Ltd. This firm has constructed for the Shell-BP Development Co. of Nigeria Ltd exploratory locations, roads, and helicopter landing platforms and also completed, early this year, a 65-mile-long 10-inch pipeline from Oloibiri to Port Harcourt. A section of this pipeline near the terminal at Port Harcourt is shown above which also gives a good impression of typical swamp areas crossed by the line.*

### New Distillation Unit at Lavera Refinery

A large new distillation unit, which raises total refining capacity of BP's Lavera refinery, near Marseilles, to 4 million tons a year, has been commissioned. The refinery is operated by BP's French associate, Société Française des Pétroles BP.

Since the war the capacity of Lavera has been raised, in several stages, from 550,000 to 2,400,000 tons a year by converting and modifying obsolescent plant for distillation purposes. The new unit, which has a capacity of 2,200,000 tons a year, will permit a smaller distillation unit to be placed in reserve.

### Shell-Mex and B.P. at the Factory Equipment Exhibition

At the Factory Equipment Exhibition held recently in London, the Shell-Mex and B.P. oil fuel centre covered 22,000 sq. ft and was virtually a complete trade fair within the exhibition.

Twenty-seven firms manufacturing industrial oil-burning equipment co-operated with the Company, and their stands were grouped around the Shell-Mex and B.P. stand, which formed the focal point of the centre.

Many types of automatic oil burners were on view, together with space heaters and oil-fired boilers for central heating installations.

Exhibits of special note included automatic heating and ventilating units with heat outputs up to 500,000 Btu hour, a range of commercial atomizers, and, shown for the first time, an air register, which is a flame stabilization unit, in which air and fuel are introduced into a boiler in correct proportions to give a controlled flame. This enables satisfactory characteristics of efficiency, burning range, and reliability to be achieved for a moderate value of pressure drop. A working model of a typical boiler house installation was shown by John I. Thorneycroft & Co. Ltd and attracted great interest. It illustrated the cycle of operation from the delivery of the oil fuel by road tanker to its combustion in the furnace.

### Conserving the World's Petroleum Resources

Cars of the future and the higher-octane gasolines they will need should actually help conserve the world's petroleum resources. This view was stated by Eger V. Murphree, president, Esso Research and Engineering Company, at the American Chemical Society's 133rd national meeting, in a study of past and future trends in gasoline and cars.

Additional energy—as crude oil and refinery fuel—will be consumed in refining to produce gasolines of higher octane value than those now available, but this will be more than offset by the more efficient utilization of these gasolines in higher-compression ratio engines, thus conserving natural resources.

The expenditure of 6 per cent more energy to produce the gasolines probably needed then will give gross benefits amounting to 21 per cent more useful energy.

In addition to conserving oil resources, the study also showed that further increases in octane number will probably be sound from the motorist's standpoint, since he should get back more in value than the added cost of making the higher octane gasoline. This value will be in terms of gasoline mileage, performance, comfort, or a combination of these.

Orderly increases in gasoline octane number and engine efficiency will continue to be sound, he concluded, as long as the increased value to the motorist exceeds the increased price of the fuel, and there is a net gain in energy from the nation's oil resources. Improved technology in both the petroleum and automotive industries, he predicted, will strengthen and prolong this trend.

### Retail Petrol Sales in The United Kingdom

In a special article on the battle for petrol sales in the United Kingdom, published on 5 April, a *Financial Times* correspondent estimates that tied garages, comparatively rare before the war, now secure 93 per cent of total retail sales. Furthermore, nearly three quarters of total sales is shared by only two groups, Shell-Mex and B.P. and Esso, although during the past five years the market has been successfully entered also by Mobil and Total Oil Products, a subsidiary of Compagnie Française des Pétroles. The latter has, however, so far sold petrol only to commercial consumers, but plans its own chain of filling stations.

The following table, of company shares in the U.K. retail market, is also extracted from the same article.

| *Company* | *No. of "tied" garages (est.)* | *Share of garage petrol sales (est.) per cent* |
|---|---|---|
| Shell-Mex and B.P. ... ... | 12,300 | 44 |
| Esso and Cleveland ... ... | 7,800 | 28 |
| Regent ... ... ... ... | 4,500 | 14 |
| Mobil ... ... ... ... | 850 | 4 |
| Petrofina ... ... ... | 850 | 3 |
| Total "tied" garages ... | 26,300 | 93 |
| Other garages ... ... | — | 7 |

### Third Deep Test Well in East Africa

BP-Shell Petroleum Development Co. of Tanganyika Ltd has started drilling its third deep test well in East Africa at Mandawa, mid-way between Kilwa and Lindi on the southern coast of Tanganyika.

The same drilling rig that was used on Mafia Island and Zanzibar, where wells reached depths of 11,051 and 14,281 ft respectively, is being employed at Mandawa. An all-weather road has been constructed 20 miles from the coast to the drilling site.

### Jersey Standard to Prospect in Portuguese Guinea

Standard Oil Company (New Jersey) has signed an agreement with the Portuguese Government to spend a minimum of $7 million over a five-year period for oil exploration and development in Portuguese Guinea in West Africa.

A new Jersey affiliate, Esso Exploration Guine, Inc., will carry out the exploration work in an 11-million acre concession on mainland and offshore areas of Portuguese Guinea.

Should commercial quantities of oil be found, the development of Portuguese Guinea's petroleum resources will be on the established 50-50 principle. Under this principle income tax as paid to the government in regard to any oil produced will not exceed a rate of 50 per cent.

### U.S. High-Energy Fuel in Production

HiCal, a high-energy fuel for the U.S. Navy aircraft and missile programme, is to be produced at the Callery Chemical Co.'s plant at Lawrence, Kansas, and first deliveries are expected to be made to the navy this month.

Later in the year the plant will go on stream to produce boron chemicals for commercial use. The plant is flexible enough to produce both HiCal and commercial chemicals in quantity.

Amongst the chemicals to be manufactured are methyl borate, sodium hydride, sodium and potassium borohydride, alkyl boranes, amine-boranes, and alkyl boric acids.

There are 20,000 ft of underground water lines, 125 pumps, and over 300 columns and reaction vessels in the plant which, when completed, will include 11 buildings and four major processing areas.

The Callery Co. has headquarters in Pittsburgh and a research and development division at Mars, about 30 miles north of that city.

### ICI Awarded The Sir George Earle Trophy

The Sir George Earle Trophy for a notable achievement in the cause of industrial accident prevention has been awarded for 1958 to Imperial Chemical Industries Ltd, "in recognition of the far-sighted policy of its board and its attitude towards the problems of industrial accident prevention and of the altruistic and generous way in which the extensive safety knowledge accumulated within its own organization had been made available continuously to industry throughout the world".

This is the third time that the Trophy, which cannot be won by individuals, has been awarded. In 1956 the recipients were H.M. Inspectors of Factories and last year it was awarded to the Birmingham and District Industrial Safety Group.

### British Cars Well Placed in Mobilgas Economy Run

In a recent Mobilgas economy run, held in Malaya, British cars secured two of the first three places. A Wolseley 6/90 was the outright winner with a figure of 43·659 mpg (84·028 ton-mpg) and a Rover 60 was third with 41·802 mpg (74·087 ton-mpg). A Borgward coupé took second place with 51·517 mpg (75·090 ton-mpg).

### Oil Price Reductions

From 10 April the price of gas oil and domestic fuel oil has been reduced by ½d. a gallon.

### Japan's First Two Ethylene Plants Go on Stream

Two major ethylene plants designed by Stone & Webster Engineering Corporation have gone on stream in Japan. A 20,000-metric ton per year unit for Mitsui Petrochemical Industries Ltd is located at Iwakuni City near Hiroshima, Japan. The other ethylene plant is a 12,000-metric ton per year unit for Sumitomo Chemical Company Ltd at Niihama on the Island of Shikoku, south of Japan's inland sea.

The Mitsui plant obtains its feedstock from a nearby refinery and the other ethylene product is used for making polyethylene by the Ziegler process.

The Sumitomo ethylene is used for production of polyethylene by the ICI Ltd high-pressure process.

A phenol and acetone plant which Stone & Webster designed for Mitsui Petrochemical is expected to go on stream at Iwakuni City shortly.

These plants are among eight petrochemical plants in Japan either recently completed or under design by Stone & Webster engineers. In carrying out this work, maximum utilization has been made of Japanese equipment, materials, and labour.

### Australia Uses More Diesel Fuel

The rate of increase in consumption of diesel fuel in Australia has remained constant at 15 per cent despite the introduction last September of a 1*s.* a gallon excise on automotive diesel oil used in road vehicles, according to the Petroleum Information Bureau (Australia). Furthermore, with the elimination of the double registration fees for diesel vehicles in some States, the rate of increase may even rise during 1958.

The States where lower diesel registration fees are already operating are South Australia, Victoria, Queensland, and New South Wales, while the matter is under consideration in Western Australia and Tasmania.

Consumption of diesel fuel in Australia in 1956 was almost 143 million gallons. It rose in 1957 to 165 million gallons mainly as the result of the continued increase in the use of locomotives by the Commonwealth and States' railway systems.

Continuation of the rate of increase will mean that Australian refineries will have to provide nearly 200 million gallons of diesel fuel to meet consumers' demands for 1958.

A BP photograph

*Recently delivered from the United States for Swedish Marine was this Vertol 44A, one of the largest helicopters in the world, which is here seen being fuelled at Bromma Airport, Stockholm*

# Around the Branches

BAHRAIN, ESSEX, FAWLEY, KUWAIT, LONDON, NORTHERN, SCOTTISH, SOUTH-EASTERN, SOUTH WALES, STANLOW, TRINIDAD

### Scottish Branch

A meeting of the Branch was held in the North British Hotel, Edinburgh, on 10 April.

Dr G. H. Smith occupied the chair and announced that at a meeting of the committee the following appointments had been made for the ensuing year—chairman, Dr G. H. Smith, M.C.; vice-chairman, Dr W. B. Peutherer; hon. secretary, W. M. Stirling; hon. treasurer, F. M. Cook; and hon. recorder, J. G. Annan.

Dr Smith introduced D. C. Proven who spoke on "Paints and Corrosion Problems in the Oil Industry".

Mr Proven said that to discuss paint in the petroleum industry was to discuss paint for almost every industry. The ramifications included tankers, petrol pumps, rail and road transport, containers from the South Pole to hot and humid Africa, and oil wells and refineries situated in diverse climatic conditions.

Paint consisted of a mixture of pigment and vehicle. The main white pigments of interest to the industry were basic carbonate of lead, basic sulphate of lead, zinc oxide, and titanium dioxide; in the colour range were red lead, lead and zinc chromate, oxides of iron and the metallic powders of zinc, lead, and aluminium.

Linseed oil still played its part as a paint vehicle, but the more important vehicles were the so-called synthetic varnishes, the alkyds, phenolics, and epikotes. The most popular were the alkyds on account of their versatility. They could react not only with drying oils during the process of manufacture but with semi-drying and non-drying oils, and made excellent weather-resisting and petrol-resisting paints, quick, hard drying, and of good colour. The phenolics were the earliest to be made on any scale. They were formed as the result of reacting carbolic acid with formaldehyde. They made an excellent waterproof medium in conjunction with tung oil but suffered from the tendency to after-yellowing. The epikote resins introduced were condensation products of diphenylol-propane and epichlorhydrin, and had excellent weather, chemical, and abrasion-resistant surfaces.

Any difference in the chemical or physical conditions of a metal at a number of points on its surface would promote corrosion. Iron and steel being heterogeneous bodies were particularly subject to rust, but corrosion could not occur without moisture. The key to the successful performance of any paint system was good preparation of the surface to be painted, in the case of new metal the removal of all scale and rust or in the case of old paintwork to ensure that the old paint was in condition to form a key for the fresh coat. The lifetime of a paint should be considered to be that time when the old coat would still successfully take the new. No paint system was completely waterproof. The best system appeared to be one which consisted of a rust-inhibiting primer, a barrier coat such as aluminium paint, and a finishing coat offering resistance to damage and to ultra-violet radiation.

After answering many questions, Mr Proven was accorded a very hearty vote of thanks.

### Stanlow Branch

A joint meeting of the Stanlow Branch with the North-Western Branch of the Institute of Fuel was held at Blossoms Hotel, Chester, on 20 February. The chair was taken by R. F. W. Guy, of the Institute of Fuel.

Dr R. R. Gordon, of the National Coal Board, presented a paper on "Coal and Oil as Partners in Energy Supply".

The lecturer dealt mainly with the use of the large quantities available of small high-volatile coals for production of smokeless domestic fuels as an immediate objective, and possibly as a raw material for the manufacture of oil products in the future.

Mention was made of a fluidization process being developed which illustrated the influence of oil-industry research on coal processing, and the fact that this process was being used experimentally for the manufacture of smokeless fuels. The possibility of applying it to the production of heavy fuel oils in the future was being examined.

Regarding light-oil production the speaker mentioned the Fischer Tropsch process, which, by combining the two methods mentioned increased oil yields by approximately 20 per cent. A much higher yield of ethylene was obtained in the refining of the products from this process than was obtained from the normal refining of petroleum products. That higher yield might well provide a starting-off point for the manufacture of chemicals.

The discussion was opened by D. J. Pull of Shell Refining Co. Ltd, and continued in a most spirited fashion until 9.30 p.m., the vote of thanks was proposed by V. Biske.

### TEL as Anti-knock

On 26 February a joint meeting was held with the Royal Institute of Chemistry, North-Western Section, at Blossoms Hotel, Chester.

Dr W. B. Whalley presided. The speaker was Professor A. D. Walsh of the Physical Chemistry Department of the University of Dundee, and his subject was "The Mode of Action of Lead Tetra-ethyl as Anti-knock".

The lecturer first described the work of Midgley, Boyd, and Kettering in their search for an anti-knock agent, which resulted in lead tetra-ethyl.

He then outlined some research by his own group on the kinetics of cylinder combustion using low-pressure oxidation in silica reaction vessels. Yellow lead monoxide pellets were introduced and a study made of the formation of both fogs and film. Numerous substances were tried and classified into two (and later three) categories: fast and slow inhibitors, using the combustion of methane as a yardstick. The first category included weak acids, silicic, boric, phosphoric, and germanium dioxide. The second included lead monoxide, metallic oxides, and halides. A third category, silver, gold, and platinum exhibited good anti-knock properties.

The mechanism of these reactions depended upon the rate of decomposition of the $HO_2$ and $H_2O_2$ groups formed in the reactions. The Professor demonstrated the rate of decomposition of hydrogen peroxide with typical members of each category, each test being duly appreciated by his audience. One "striking" test, performed with a hammer, demonstrated the conversion of yellow to red lead monoxide.

After the discussion, Dr Whalley thanked Dr J. B. Matthews for help in arranging Chester meetings and called upon A. Cluer who proposed the vote of thanks to Professor Walsh.

**Handling Symposium**

On 19 March a meeting of the Branch was held at Blossoms Hotel, Chester.

In the absence of the chairman and hon. secretary, both of whom were attending a meeting of the Branches Committee, the chair was taken by W. E. Frankenburg.

The chairman introduced the three speakers in the Handling Symposium.

The first paper was on "Bulk Oil Handling" by M. D. Ray (Shell). The subject could be divided into two main sections, transport by water and by land (pipeline, rail, road). Dealing with the first of these, the speaker gave a brief outline of tanker history and design, and then discussed loading procedures which could be either by shore pump or gravity, including the quantity checks required for the bills of lading to be prepared; he then followed this with the reverse unloading procedure carried out by the ship's own pumps.

At the middle of 1957 the world tanker fleet (vessels exceeding 2000 tons) amounted to 47 million dw tons valued at £3750 million.

Turning to land transport, the speaker first dealt with pipelines, the largest of which had now a diameter of 34 inches and the cost of which could be up to £75,000 per mile. In many countries pipelines were treated as common carriers; although they were a cheap form of transport if operated at capacity, under-operation was uneconomical.

Finally, the lecturer mentioned road and rail transport. Outside the U.K. rail tankers could attain 50 tons. The use of meters both for loading and discharging was on the increase.

The second speaker, M. Ingram (Lobitos) spoke on "Packages". The original form of oil package was still perpetuated in the use of a barrel as a unit of measure. In the U.K. to-day 20 million packages, consuming about 150,000 tons of steel, were manufactured annually and half of these were used by the oil industry. The new type drum (45/46 gallons) introduced in 1957 to fall in line with U.S. practice and to reduce shipping space was discussed. Many companies often painted their drums a distinctive and individual colour even though this might add 5*s* a ton to the cost of the product.

The last lecturer, N. B. Gilmore (Shell), took "Oil Stocks Accounting" for his subject. Despite the increasing attention paid to automatic gauging the manual method was still that most widely employed, to some extent on account of Customs preference, although Customs would be prepared to accept alternative methods when they were satisfied that they were accurate. The importance and value of the IP measurement manual and tables were stressed.

Customs and Excise aspects of oil accounts were explained and the importance of oil stock accounts in respect of loss control was stressed both from the Customs' and companies' aspects.

**South Wales Branch**

On the 13 March at the BP Training Centre, Llandarcy, members of the Branch heard T. Chippendale address a joint meeting with the South Wales Branch of the Institute of Fuel. At this meeting a number of the local industries, such as steel, coal, and gas were well represented.

Mr Chippendale's subject was "Oil Fuel Applications with special reference to South Wales", and he participated to a very large measure in the conversions to oil fuel burning especially in the steel industry at Margam and Cardiff. Mr Chippendale illustrated his talk with slides showing the various types of burners and improvements in techniques which have resulted in such economies as the reduction of oil fuel consumption in open hearth furnaces from the early 30/36 gal/ton to 20 gal/ton.

He made reference also to the use of oil fuel in annealing furnaces for tinplate coils and in the aluminium industry for melting.

Some time was spent in describing the Schueldrop self-proportioning burner, the use of automatic controls by servomotor, and the development of the Etchells burner for bar heating furnaces and lately for billets of Sheffield steel.

The peculiar difficulties in heating brick kilns also received attention.

Mr Homer, National Coal Board, and Dr Thornes were joint chairmen.

A spirited discussion ranging over several industries and applications followed the talk which was wound up by the vote of thanks proposed by Mr Crook of the Institute of Fuel which was heartily accorded.

# Books and Films

### Prevention and Control of Petroleum Fires

Mobil Oil Co. have recently added to their film library a new production entitled *Fire Under Control*. This new film was made by Socony Mobil Oil Co. Inc. on their fire training grounds in New York and replaces *Beneath the Flames* which, during the past 2 years, has been in constant demand by fire brigades and industrial safety officers throughout Britain.

*This shot shows how two fire-control experts can extinguish spilled blazing petrol in a matter of seconds*

*Beneath the Flames* was concerned only with control of oil-tank fires by air agitation, but *Fire Under Control* deals with all aspects of petroleum fires in the home, workshop, and refinery.

The new film shows that prevention of fires depends basically on correct storing, handling, and use of products such as kerosine, fuel oils, and petrol. However, once a fire has broken out, a knowledge of the characteristics of each product and the types of oil fires is vital in controlling and extinguishing the blaze with the minimum damage. Modern highly effective methods of controlling and extinguishing oil fires by means of air agitation, foam, carbon dioxide, dry chemical blanketing, and water fog are shown.

*Fire Under Control*, which is in colour, runs for 23 minutes and 16-mm copies are available on loan from the Mobil Film Library, Sound Services Ltd, 269 Kingston Road, London, S.W.19.

### *Pattern of Supply*

Wherever there is human life, whether it be in the jungle, in the desert, or in thickly populated areas, there is a need for the products of petroleum. Fuels are required for use in transport of all kinds, kerosine for lighting and heating, bitumen for roads and for waterproofing, and the full variety of products for innumerable purposes.

Not the least important and essential task of the petroleum industry is to ensure that the product is where it is wanted when it is wanted. *Pattern of Supply*, a 28-minute colour film, illustrates how one group of oil companies has tackled the problem of distribution. Its location is the world and it tells an interesting story. Produced by Bert Haanstra and directed by Alan Pendry, with camera work by Alan Fabian, this latest Shell film is distributed only by Shell-Mex and B.P. Ltd (in England and Wales) from Shell-Mex House, Strand, London, W.C.2 and (in Scotland) by Scottish Oils and Shell-Mex Ltd, 53 Bothwell Street, Glasgow, C.2.

### *Report Writing*

The ABC of good report writing—accuracy, brevity, clarity—is outlined in a handy booklet recently published by the British Association for Commercial and Industrial Education.

Following its expressed principle of brevity, *Report Writing*, in the commendably compact space of 17 pages, endeavours to show the way to a grasp of the report writer's art. A caution is included, however, that the way is not easy, but that "Hard writing makes easy reading".

A logical method of tackling the problem is proffered; this has four stages—preparation, arrangement, writing, and revision—none of which may be omitted in the search for success. Each section of the book tersely defines fundamental steps or asks the reader some searching questions.

Semi-jocular drawings are interspersed throughout the text. By collating every-day occurrences with a telling caption a powerful effect is obtained. For instance, under a drawing of a policeman taking notes from a harassed driver whose car has encountered a lamp post is the caption, "Check your facts for accuracy".

A series of 1-page appendices draw attention to note making, illustrations, technical reports, presentation and style, and "You and the typist".

*Report Writing*, which is a companion volume to *Tips on Talking*, was compiled by a joint committee of the West Midlands Group of the BACIE, Presentation of Technical Information, Midland Group, Midland TWI Association, and the Department of Industrial Administration, Birmingham College of Technology. Copies, price 2s post free, can be obtained from the BACIE, 26a Buckingham Palace Road, London, S.W.1, from the Midland TWI Association, Central Education Dept, Joseph Lucas Ltd, Great King Street, Birmingham 19, or from the College of Technology, Gosta Green, Birmingham, 4.

### *Our Industry*

The stupendous rise in total world crude oil production from 69,000 tons in 1860 to 756,778,000 tons in 1955, which epitomizes the fantastic growth of the industry in less than a century, might well be taken as the theme of a recently published book. This comparison of output, however, is only one of the innumerable facts contained in the section on statistics and data that forms part of the third edition of *Our Industry*. The book was produced by the British Petroleum Co. Ltd for private circulation only as an introduction to the industry for use by members of the Company's staff, and a very comprehensive introduction it is!

A brief look at the history of the industry leads to chapters on production, refining, transport, and distribution. The second part of the book covers petroleum products and their uses, and the third part discusses the industry, with special emphasis on research and the contribution that oil is making to world energy requirements.

The whole gamut of operations is covered from winning the crude from the earth to the assessment of product quality.

The book is concluded by a section of general information which, in addition to the statistics and data, contains a glossary and bibliography.

# Trade Literature, etc.

### Gas-oil Burner Contract for Rotterdam Refinery

Airoil Burner Co. (G.B.) Ltd of Uxbridge, have been awarded a contract worth £25,000 in guilders for the installation of gas-oil burners for main crude-distillation furnaces at the new refinery built at Rotterdam for the Netherlands Esso organization.

### New Tapping Fluid

A new tapping fluid has been introduced by Amber Oils Ltd, 11a, Albemarle Street, London, W.1. Known as AP cutting fluid, it is an extreme pressure coolant with unusual penetration properties. It was originally produced for tapping armour plating, but has been found suitable for tapping all very high-tensile materials, including Nimonics, etc.

The savings in tool costs and production delays achieved by using the fluid more than offset its cost.

The Company also manufacture specialized industrial oils, and several aerosol-packed products, including Ambersil silicone-spray mould lubricant. The Company is a member of the Amber Group of Companies, which includes Amber Chemical Industries Ltd, the Amber Chemical Co. Ltd, Causeway Reinforcement Ltd, and Charles H. Windschuegl Ltd.

### Tropical Air Conditioner

Temperature Ltd, London, S.W.6 have recently introduced a nominal 1-hp, hermetically sealed and water-cooled Tropical room air conditioner, designed for use in the hot countries with relatively high humidities. It is for air-conditioning new and existing buildings, is unobtrusive, and can be installed without spoiling the appearance of building fascias by undesirable protrusion of room cooler exteriors.

### New Kit for Water-Treatment Control

A new and simple testing kit enables control tests to be made easily and quickly on different types of water. The results obtained are adequate for the great majority of water treatment control purposes, although slightly less accurate than those obtainable under closely controlled laboratory conditions.

The new kit can be used for the control of water treatment for steam boilers, including those where phosphate conditioning is employed, as well as for checking water softener efficiency and testing water in re-circulated cooling water systems.

Further information can be obtained from Albright & Wilson (Mfg) Ltd, 1 Knightsbridge Green, London, S.W.1.

### New Shell Multigrade Oils

Two new oils in the Shell Rotella range have recently been introduced by Shell-Mex and B.P.—Shell Rotella multigrade 10W/30 and Shell Rotella T multigrade 10W/30.

They are produced from high viscosity index solvent-extracted base oil at Shell refineries, and incorporate the same heavy duty additive used in Shell Rotella oils.

Three main advantages are fuel saving, reduction of wear, and increase in battery life.

### New Dutch-American Chemical Company Formed

On 5 March a new company, Cyanamid-Ketjen NV, was founded by the American Cyanamid Co. of New York and Koninklijke Zwavelzuurfabrieken v/h Ketjen NV, Amsterdam, in which both companies participate for equal parts in the capital of the new company.

The first plant of this joint venture of ACC and Ketjen is under construction on a site adjoining the Ketjen works. The first product will be a platinum catalyst for the oil industry.

### U.K. Agents for Swiss Instrument Manufacturer

Short & Mason Ltd, 280 Wood Street, London, E.17, have concluded an agreement with Aktiengesellschaft Chemisches Institut Dr A. G. Epprecht, Zurich to act as sole agents in Britain for the range of Drage instruments.

An instrument application department has been set up to advise on the use and installation of the instruments, which include torsional viscometers, rheometers, and plant assemblies for automatic control of viscosity.

The new Drage multitest tensile, compression, and bending test machine will also be available.

### Multi-function Pneumatic Relays

Fifty schematic diagrams illustrate an attractive brochure on the most frequently used functions which can be produced by pneumatic multi-function relays.

These relays, introduced some 8 years ago, have solved many control problems that involve interlocking and multi-element circuits.

The brochure can be obtained from Sunvic Controls Ltd, Harlow, Essex, who claim that more than 1000 combinations of assembly are possible with this type of relay.

### Bonallack & Sons Ltd to Build Road Tankers

Bonallack & Sons Ltd have recently completed to the order of Shell-Mex and B.P. Ltd, a 2000-gallon road tanker body to carry petroleum spirit. This marks the entry of the Company into the road tanker field. The Company can now offer operators complete finished tank wagons from delivery of chassis at the works onwards.

Although the Company is usually identified with the building of bodies in light alloy, the construction of tankers will be undertaken in mild or stainless steel, as well as in aluminium alloys.

### Asphalt Lining Checks 2-Million Gallon Canal Leak

Lining works carried out by the Trinidad Lake Asphalt (North Western) Co. Ltd on the Llangollen branch of the Shropshire Union Canal have reduced water leakage by 90 per cent on one short section of the canal.

It had long been known that more than 2 million gallons a day were being lost through fissures in the bed of a 900-yd section of the canal. Attempts were made to remedy this with clay puddle and clay "raffle" linings, but these did not prove effective for long.

The use of hot asphalt for canal lining, although common in America and on the Continent, is not well known in Britain but, because costs were favourable for this treatment, it was decided to adopt asphalt for the new lining on an experimental basis.

Much preparatory work preceded asphalting, including dredging 2 ft of silt, lining the bed with limestone, and constructing new side slopes. These slopes were formed of 1½-inch limestone stabilized with three coats of bitumen emulsion to give a satisfactory surface for the asphalt. The asphalt lining, to BS 594, was of two-course construction and 2½ inches thick. Trinidad bitumen was used to seal the joints between the asphalt panels and to make a bond between the asphalt and rock outcrops where necessary.

### Vertical Air Circulation Furnaces

A new illustrated pamphlet has been issued by Metalectric Furnaces Ltd, Cornwall Road, Smethwick 40, Staffs.

It gives full details of their range of furnaces which are specially suited for processes where precision treatment is required, such as in the tempering of carbon steels, non-ferrous annealing, and light-alloy heat treatments.

### New Light-weight Nylon Tubing

Tecalemit Ltd, of Plymouth, are now manufacturing a range of ight-weight heat and ultra-violet-light resisting nylon tubing.

With a weight only 1/9th that of copper, the new tubing does not require preforming, is precision extruded, and can be supplied in semi-rigid or fully flexible form.

It can be used for lubrication lines, for hydraulic controls, or for conveyance of air, fuel, chemicals, coolant, or liquid foods.

### Descaling a Refinery Tower in Trinidad

During erection it was found that the inside of an 11-ft-6-in dia 90-ft high column for a refining unit in Trinidad had become rusted as a result of exposure to moist air for about 4 months.

Descaling was proposed by means of pneumatic hammers on the outside and wire brushes inside. However, an engineer of Metal and Pipeline Endurance Ltd suggested employing electrolytic descaling to save time and expense. This was adopted.

The tower was filled with water and salt and a temporary anode, energized with direct current, was inserted. Within 48 hours all the rust had peeled off and dropped to the bottom of the tower, leaving clean steel under a fluffy white calcareous coating. Washing with high-pressure water and coating of the surface with lubricating oil to prevent re-rusting completed the treatment.

### New Small High-speed Diesel Engine

A new small four-cylinder high-speed diesel engine has been introduced by F. Perkins Ltd of Peterborough.

Known as the Four 99, the new 1·6 litre engine weighs only 320 lb but develops 43 bhp at 4000 rpm for cars, 42 bhp at 3600 rpm for vans and lorries, and 32 bhp at 3000 rpm as an industrial version.

The engine, which has been under development for the past six years, has passed stringent tests for reliability and long life. More than 1 million road miles have been covered by vehicles powered with the new unit. After 3000 hours of continuous running at 3000 rpm under full load it was found that the pintle-type injector nozzles were still perfectly serviceable. The engine also incorporates a patent new combustion system, which promotes complete combustion and reduces fuel consumption.

Conversion units are available for the Bedford 12 cwt van, the Austin Omnivan, and the Morris J2 van, and for certain private cars.

### Electrode Holders

It is regretted that the information given under this heading on page 141 in the April issue was incorrect in several respects. The two types of Jackson electrode holder now being manufactured by the Lincoln Electric Co. Ltd at Welwyn Garden City are the A.W. and J.H.2 models. Both are fully insulated, and give full protection from accidental arcing. The jaws have fibre-glass reinforced plastic insulators for greater heat resistance and durability, with specially designed handles to give greater ventilation and operator comfort.

Type A.W. is a medium class holder which will operate at up to and including 300 amp. With a weight of 14 oz (length 9¾-inches) it is one of the lightest holders made to take ¼-inch electrodes.

The J.H.2 Holder is rated to operate at up to 200 amp and will handle $\frac{5}{32}$-inch electrodes. With its low weight of 9½ oz (8-inches long) and streamlined construction, the J.H.2 is especially recommended for work in difficult places and for reducing operator fatigue.

### British Hustle in Mexican Expansion

Only six months after the first decision to make wire ropes in Mexico, the new company jointly formed by British Ropes Ltd and a Mexican industrialist, Ing. G. Saavedra, has just delivered its first 16,000 m of wire rope, and the factory is in production on a two-shift basis.

### Cathodic Protection for Ocean-Going Vessels

F. A. Hughes & Co. Ltd, London, have now fitted their cathodic protection schemes to the under-water hulls of over 130 ocean-going ships.

No delay is involved in equipping a ship with this protection against corrosion as the scheme is fitted well within the routine drydocking. Streamlined anodes are mounted at the turn of the bilge and are designed to fair into the underwater form, eliminating any practical interference with the vessel's speed.

This negligible effect on speed is emphasized by the findings of a prominent research body whose calculations show that the speed of a typical vessel of 25,000 dw tons was influenced by as little as ¼ per cent. When the anodes are half consumed, this value reduces to $\frac{1}{16}$ per cent. Such figures are the more impressive when considered in conjunction with the 3–4 per cent reduction in speed which may be expected with only slight roughness of the hull due to corrosion.

### New Hygrotherm Brochure

Hygrotherm Engineering Ltd have published a brochure of special interest to chemical engineers concerned with plant in which heat transfer is the main unit operation.

The brochure starts with a survey of the firm's background and the research, design, and construction services it offers to the chemical industry. In five subsequent sections it deals with indirect heat transfer, heat generators, distillation plant, jacketed vessels, and Hygrotherm systems. It concludes with specifications covering five organo-silicate heat-transfer systems.

Copies may be obtained from the Company at either 5 Fitzhardinge Street, London, W.1 or 115 Princess Street, Manchester, 1.

### BP Orders Super-fuellers for Super-jets

The BP Co.'s Aviation Service has placed an initial order for two specially designed 10,000-gal aviation fuellers, the largest ever ordered and having about three times the capacity of the average fueller at present used on airports.

One of the new fuellers will be built by Thompson Bros (Bilston) Ltd, of Bilston, Staffs, and the other by Saunders-Roe (Anglesey) Ltd at their Beaumaris works.

The fuellers, to be known as the "Yorkshire" type, should be in service early next year on Continental airports where the hydrant fuelling system cannot be installed until experience has been gained in handling and parking super-jet airliners, such as the Boeing 707 and Douglas DC 8, which have a fuel capacity of 18,000 gal. Two Yorkshire fuellers will be able to deliver this amount by pressurized underwing fuelling in about 15 min, equivalent to over 4 tons a minute.

### Pneumatic Hoists and Rams

A new brochure describing their range of pneumatic hoists and rams has been issued by the Consolidated Pneumatic Tool Co., 232 Dawes Road, London, S.W.6, from whom copies can be obtained.

In 24 pages it sets out and illustrates, in addition to the hoists and rams, numerous fittings, such as trolleys and trunnion mountings. Sections deal with multi-purchase hoists, pneumatic bench vices, operating valves, and light-type cylinders. Notes are given on service spares and lubricating procedure.

### British Diesel Engines for American Trucks

One of the American "Big Four" truck manufacturers is now offering two types of Perkins diesel engines as alternative equipment in the United States and overseas.

Since 1938 F. Perkins Ltd, of Peterborough, have been supplying diesel engines for the British-built Dodge and Fargo trucks and now the Chrysler Corporation of America have made Perkins P6 and R6 engines available also for their U.S.-built Dodge, DeSoto, and Fargo vehicles. The Perkins P4(C) car-type diesel engine is also being offered as optional first equipment in the American Plymouth car.

### Electronically-Controlled Machine Tool Speeds Aircraft Production

A new 50-ton electronically-controlled machine tool is now operating in Britain, which can produce machined integral aircraft components up to 30 times faster than any prevailing system or method in Europe.

Known as the Fairey Ferranti three-dimensional high-speed miller, it is one of the most advanced machine tools in the world. By milling large aircraft components direct from slabs of light alloy it will speed aircraft production and lighten structural weight.

It was designed and built by the Fairey Aviation Co. Ltd, in conjunction with Ferranti Ltd, Edinburgh, and is operating at the Fairey works at Heaton Chapel, Stockport.

### New Pneumatic Multiplying Relay

A new multiplying relay has been developed by Sunvic Controls Ltd, Harlow, which multiplies, divides, or extracts the square root of pneumatic signals in the 3–15 psi range. It will, for example, also produce an output representing the ratio of two independent variables, such as flows.

The actual relay, which plugs into self-sealing sockets inside the metal cover which is designed for wall or back-of-panel mounting, can be inserted after piping is complete and can be removed without tools or escape of air.

The services of an **Assistant Engineer** are required in connexion with oil refinery maintenance. His immediate duties will relate to inspection and preventive maintenance: applicants should therefore have had experience of this work in chemical works or refineries. The commencing salary will be £1000 to £1250, depending upon experience and qualifications. The successful applicant must be a corporate member of a professional engineering institution. Applications should be addressed to the Refinery Manager, Lobitos Oilfields Ltd, Ellesmere Port, Cheshire.

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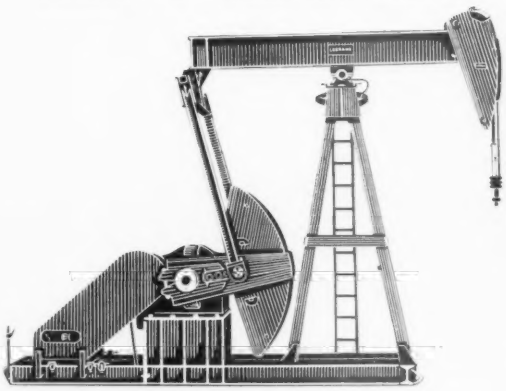

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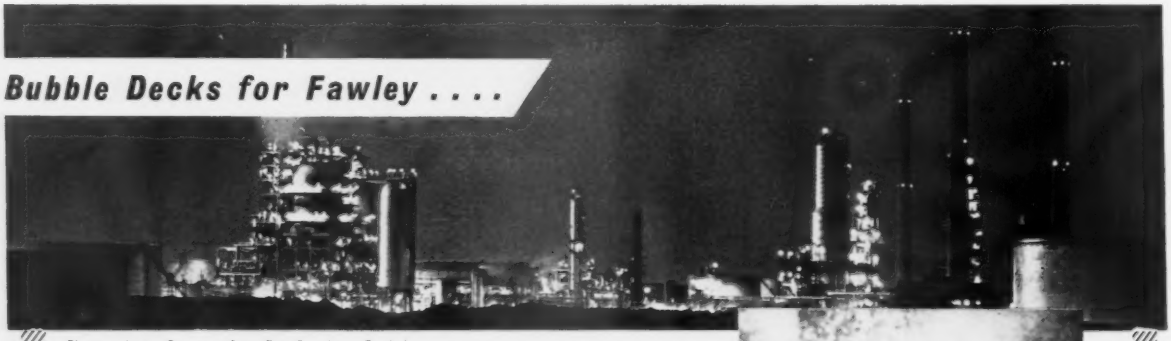

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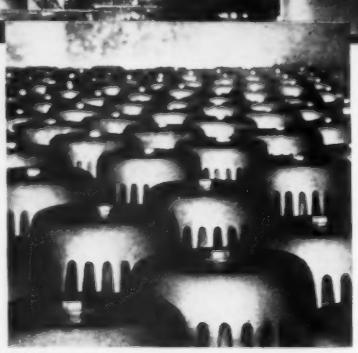

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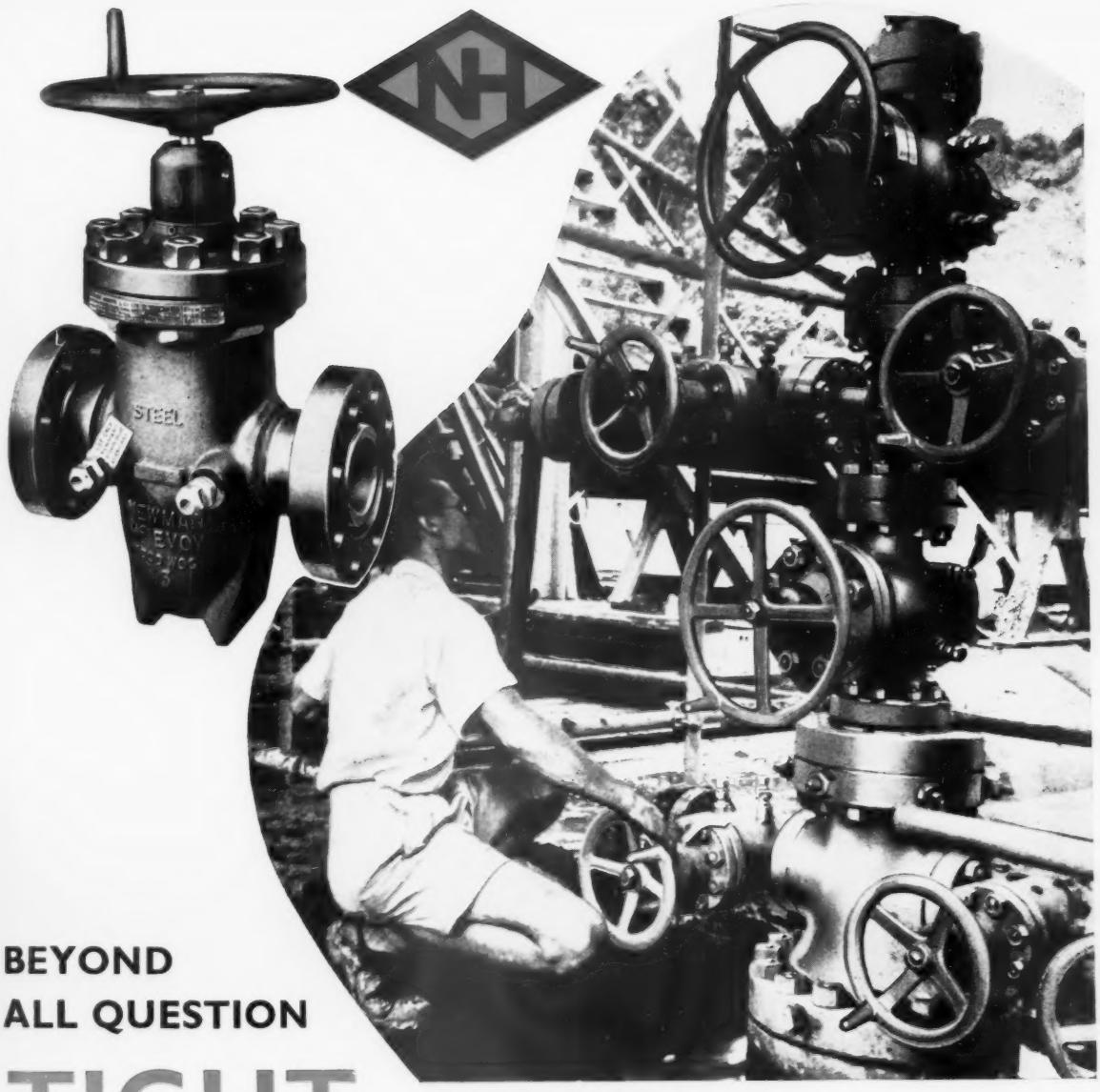


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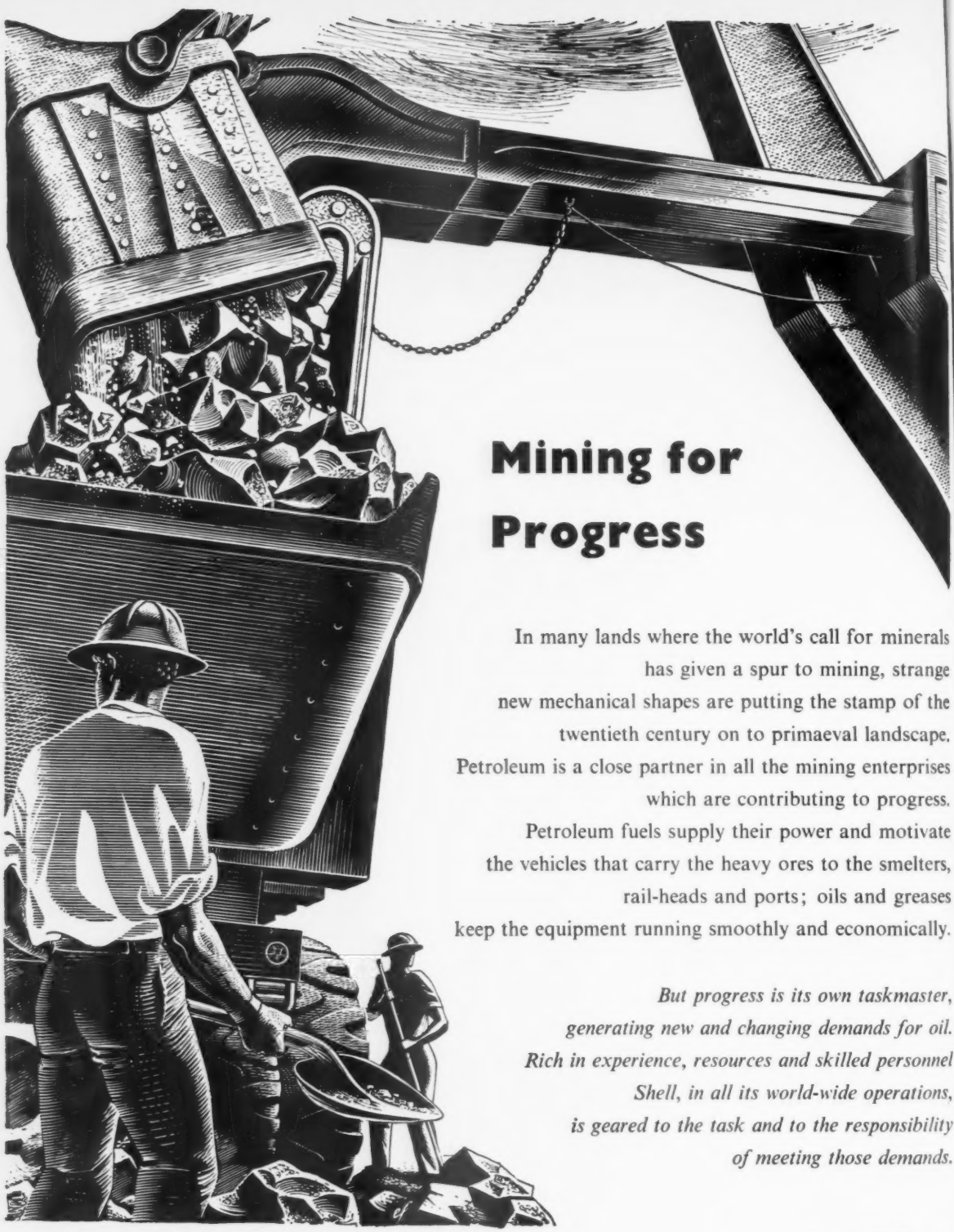

# Mining for Progress

In many lands where the world's call for minerals has given a spur to mining, strange new mechanical shapes are putting the stamp of the twentieth century on to primaeval landscape. Petroleum is a close partner in all the mining enterprises which are contributing to progress. Petroleum fuels supply their power and motivate the vehicles that carry the heavy ores to the smelters, rail-heads and ports; oils and greases keep the equipment running smoothly and economically.

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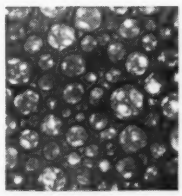

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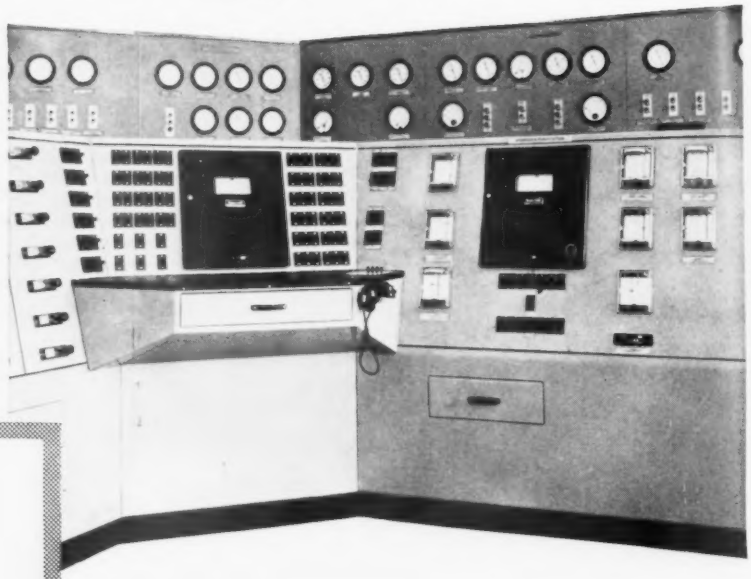

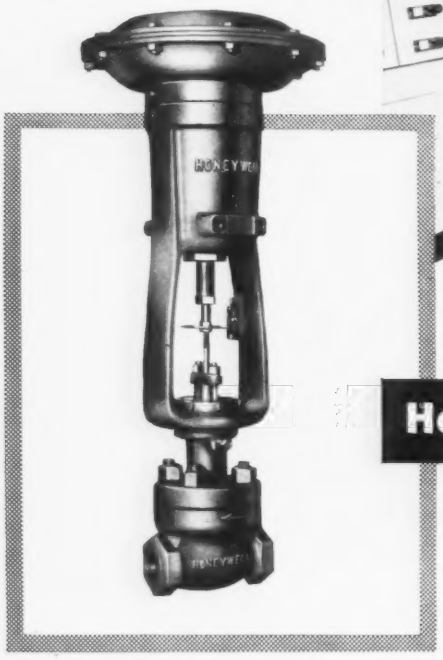

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If thin Finn, on his lonesome trip bent,

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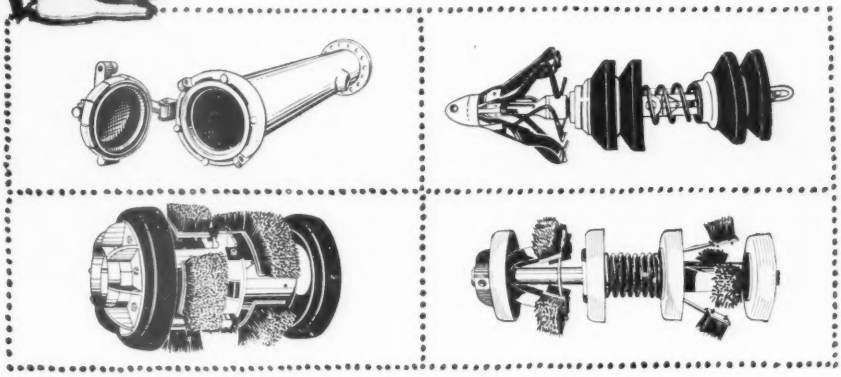

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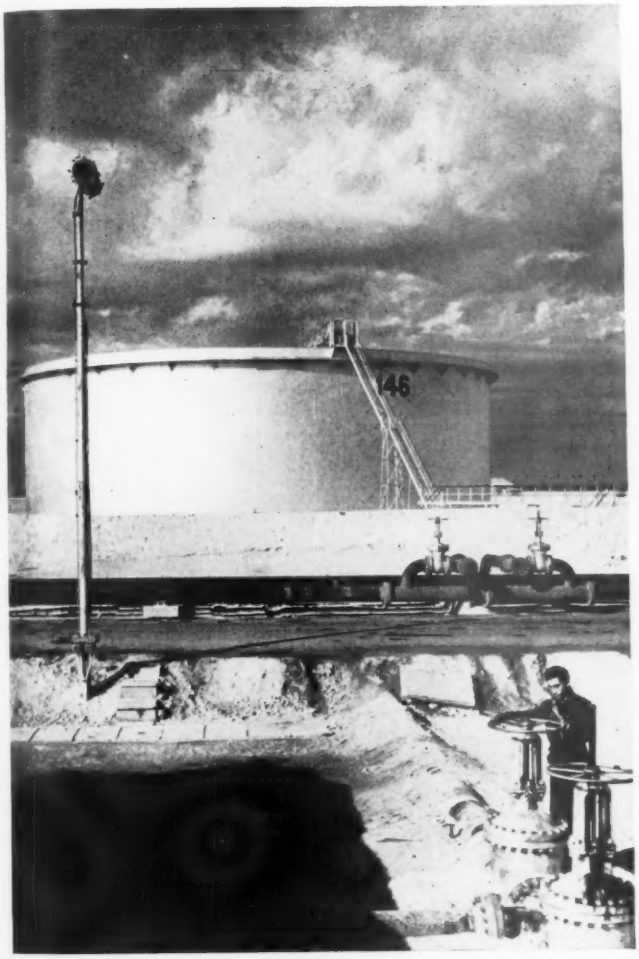


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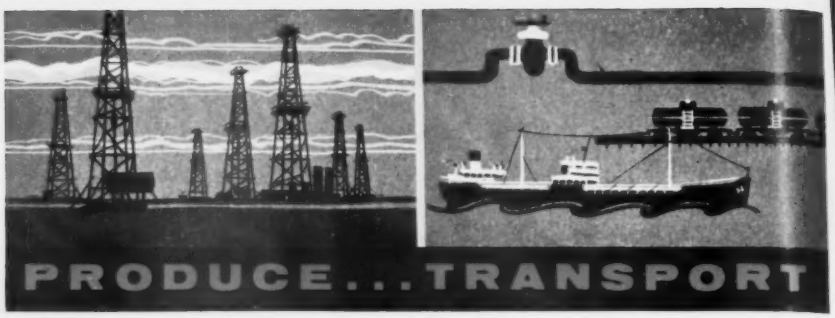

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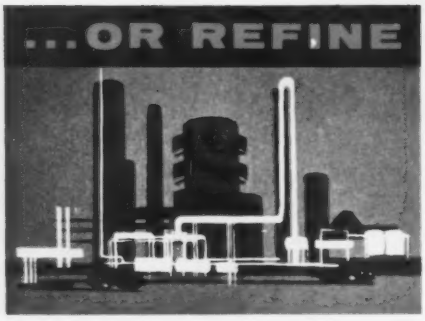

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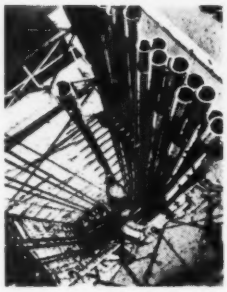

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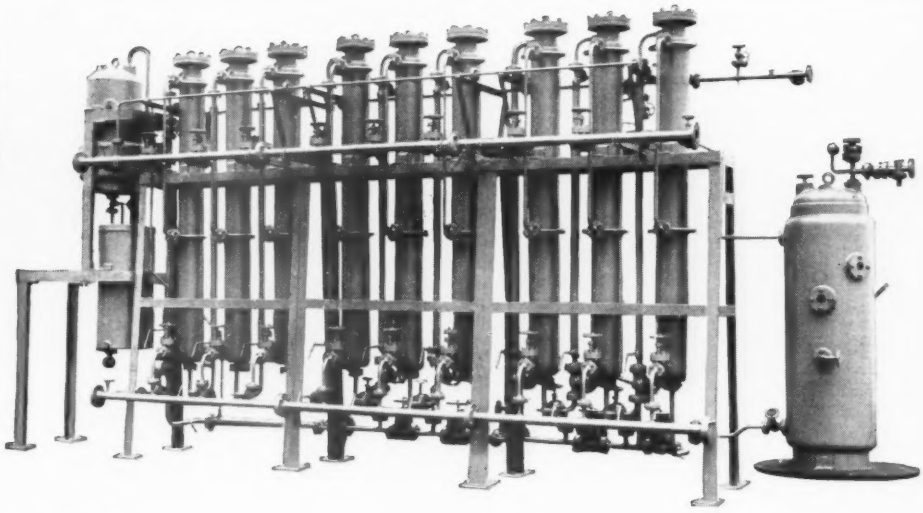

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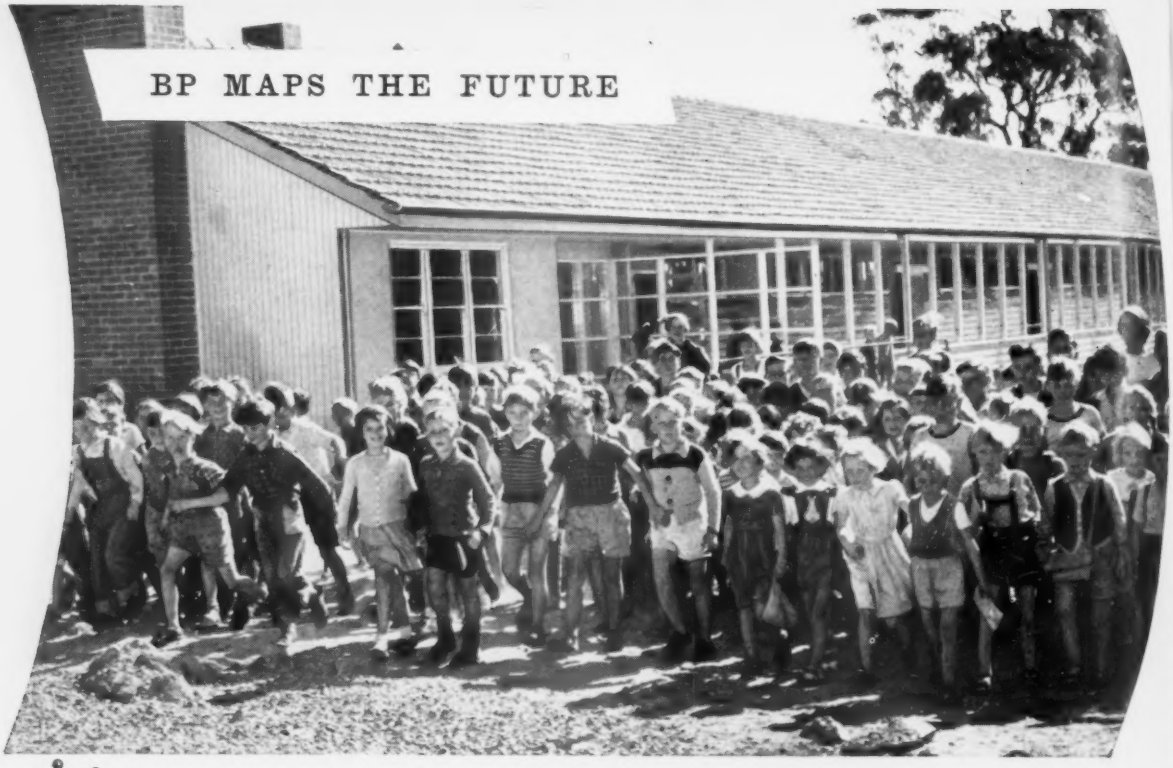

**Children** of Medina, the new township near Kwinana Refinery, outside their splendid modern school.

# A new township springs up in Australia

SEVENTEEN MILES south of Fremantle, the main port of Western Australia, is Australia's biggest refinery – Kwinana – owned and operated by one of the British Petroleum group of companies.

Nearby a new township has risen amid the gum trees and casuarinas of the Australian bush. Named Medina, it has been built by the Western Australian authorities as the first part of a large new town to house many thousands of people whose livelihood will be mainly bound up with oil.

This new town has been planned not only for personnel of Kwinana Refinery, but also for employees of the new industries attracted to the area by the building of the refinery, with its ready supply of fuel oil and other products.

Kwinana started operating in 1955, and can now process 3,000,000 tons of crude oil a year. Important new plant is at present being added to meet Australia's ever increasing demand for oil products.

In Australia, as elsewhere, The British Petroleum Company plans the future by taking practical steps today.

*THE* ***British Petroleum***
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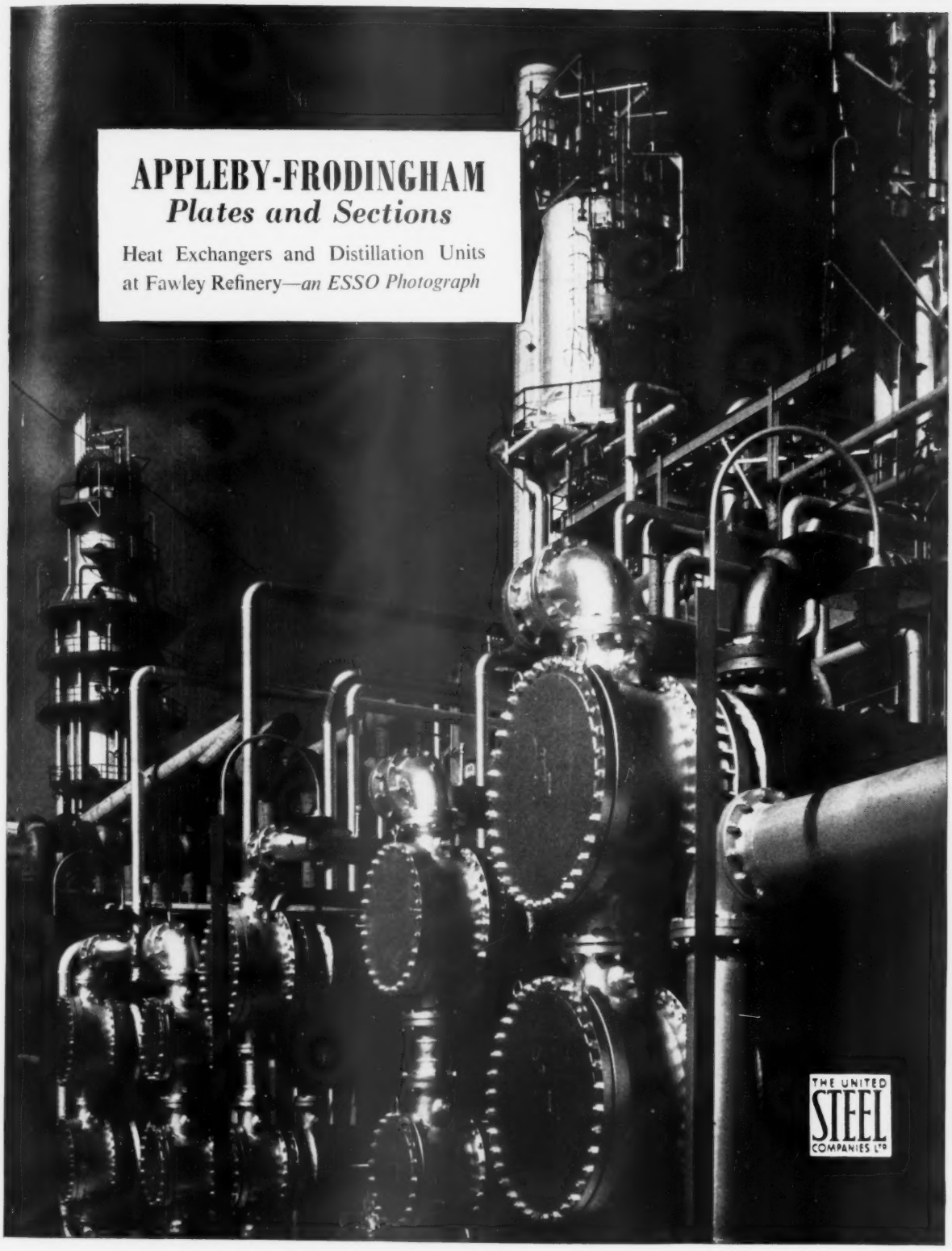


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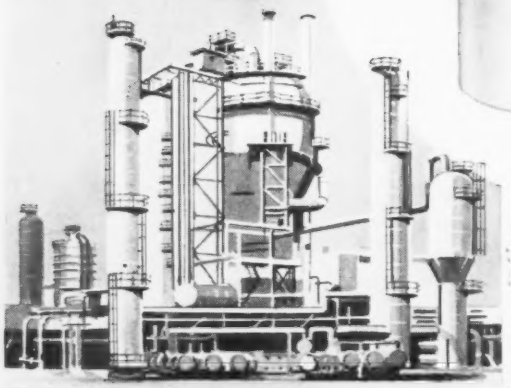

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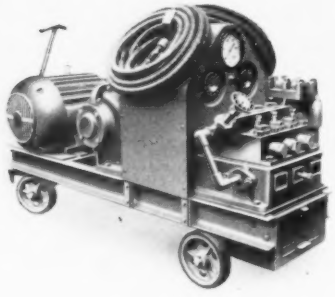

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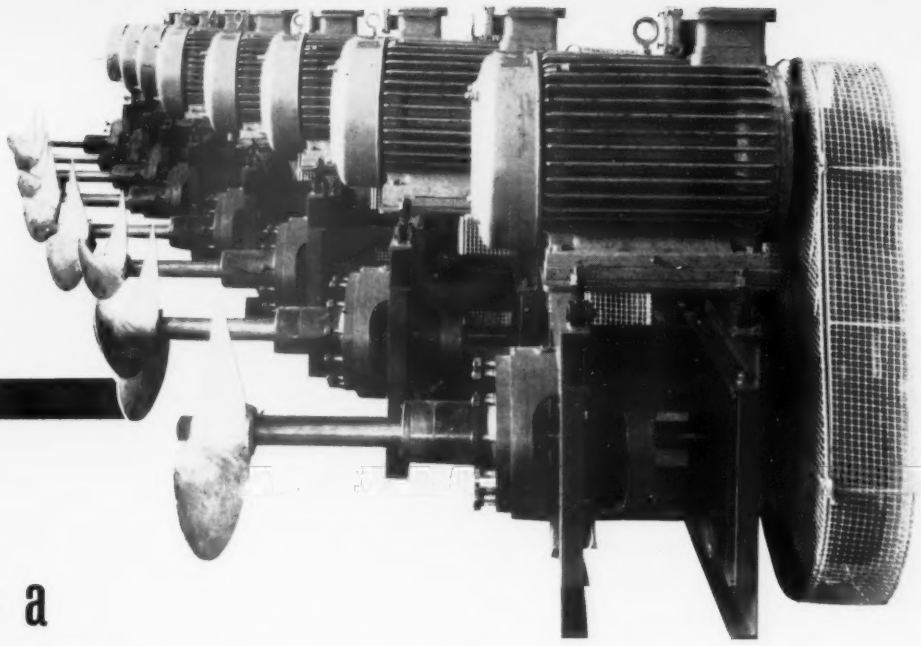

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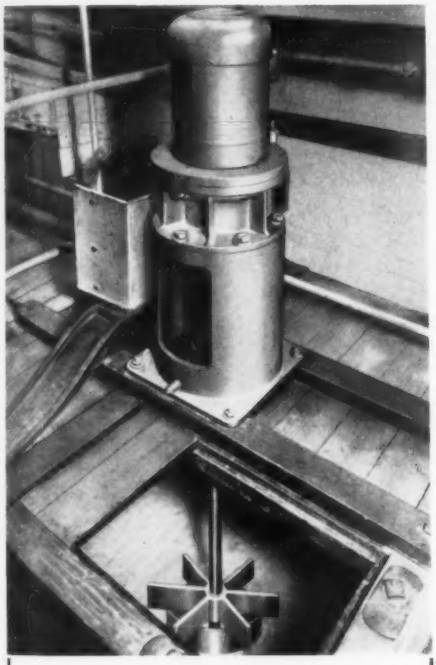
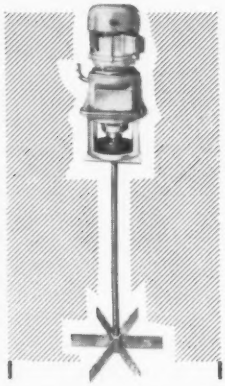
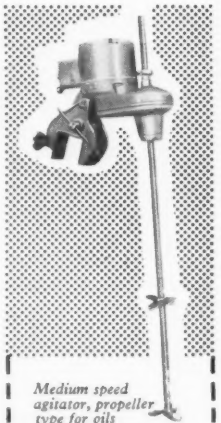


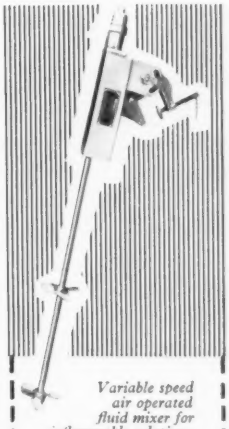
*GVD type medium speed fluid mixer fitted with open type turbine impeller and stabiliser ring for oil and grease blending and for the inclusion of additives into lubricating oils.*



*Heavy duty 460 r.p.m. permanently mounted fluid mixer with turbine impeller.*



*Medium speed agitator, propeller type for oils and grease blending.*



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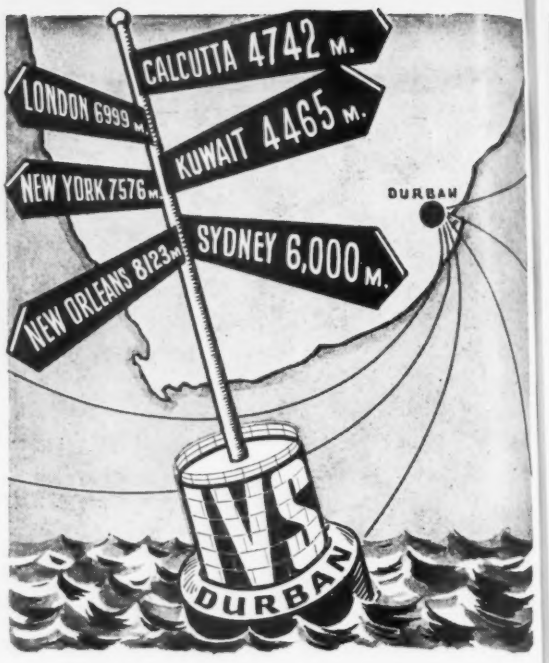


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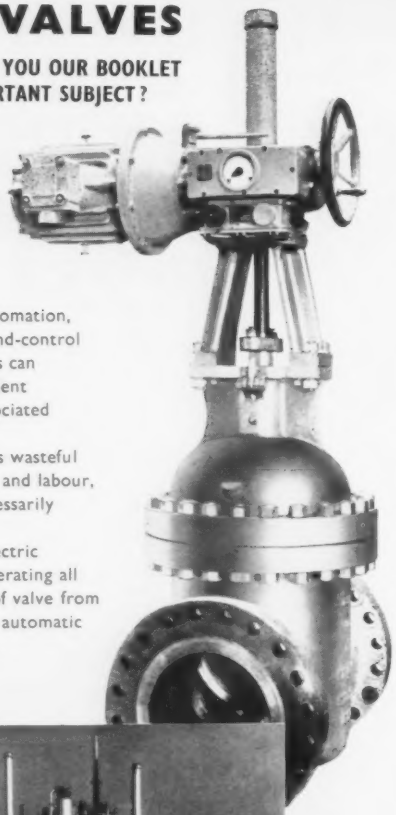

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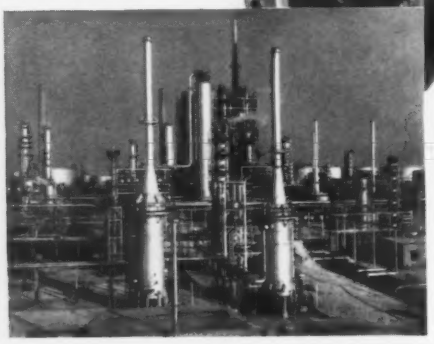

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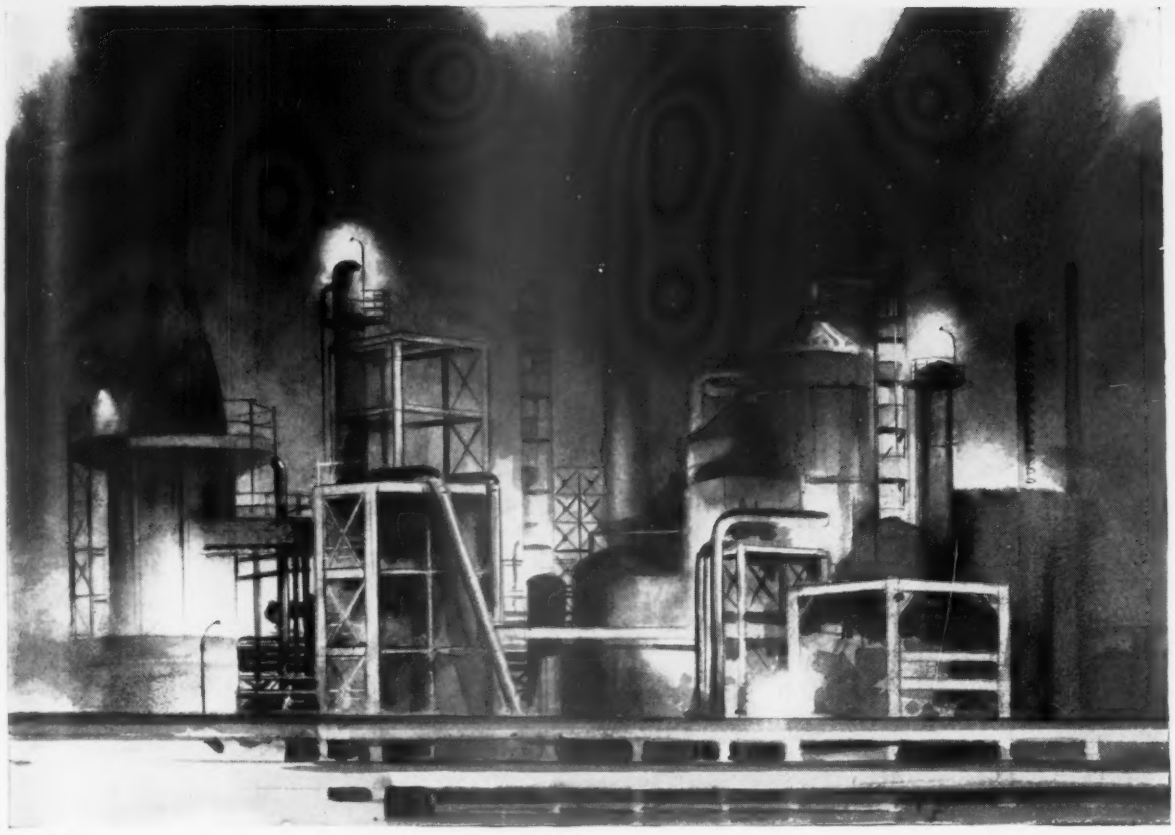

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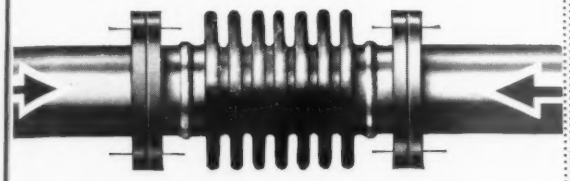

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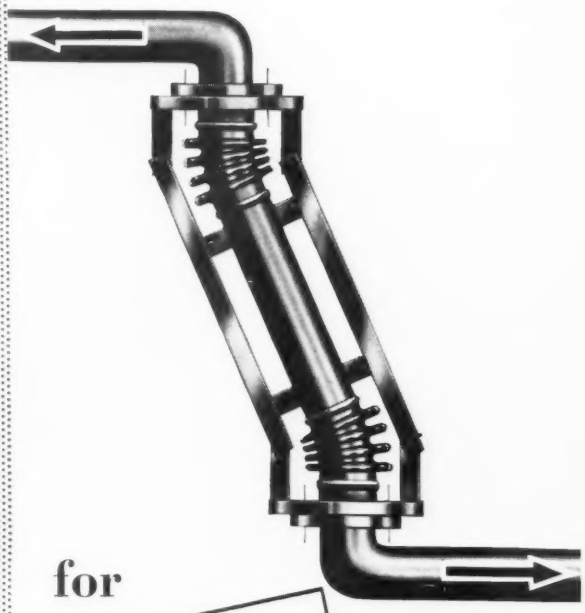

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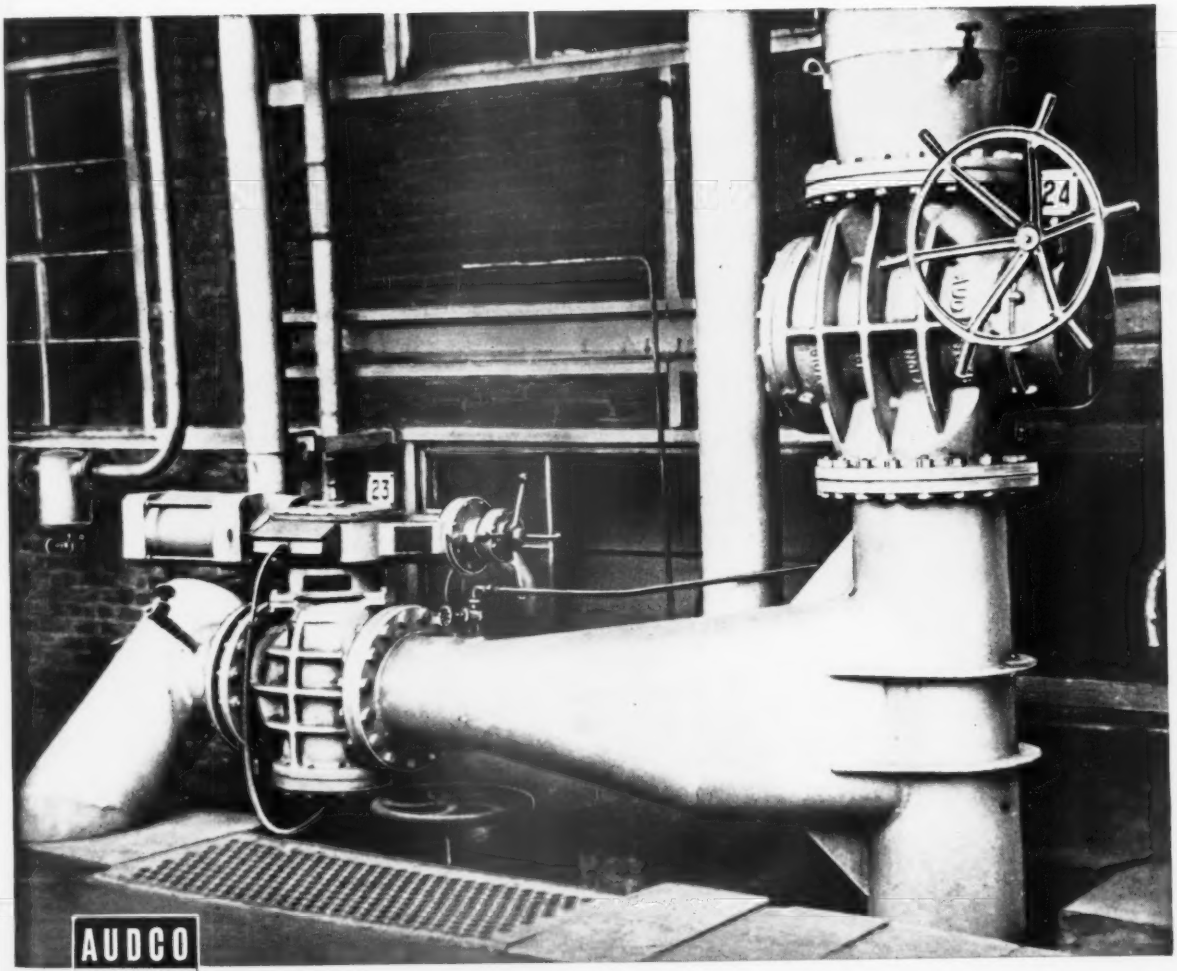


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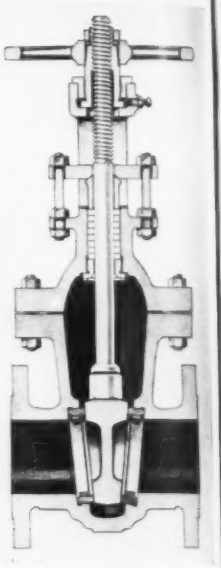
| | 4 | 9 | 15/16 | 9 | 6 3/16 | 1/16 | 27 |
| | 6 | 11 | 1 | 10½ | 8½ | 1/16 | 35¼ |
| | 8 | 13½ | 1⅛ | 11½ | 10¾ | 1/16 | 45 |
| | 10 | 16 | 1 3/16 | 13 | 12¾ | 1/16 | 53½ |
| | 12 | 19 | 1¼ | 14 | 15 | 1/16 | 60½ |
| CLASS 300 | 2 | 6½ | ⅞ | 8½ | 3¾ | 1/16 | 20¾ |
| | 3 | 8¼ | 1⅛ | 11½ | 5 | 1/16 | 24¾ |
| | 4 | 10 | 1¼ | 12 | 6 3/16 | 1/16 | 30¼ |
| | 6 | 12½ | 1 7/16 | 15½ | 8½ | 1/16 | 39½ |
| | 8 | 15 | 1⅝ | 16½ | 10¾ | 1/16 | 47½ |
| | 10 | 17½ | 1⅞ | 18 | 12¾ | 1/16 | 56¾ |
| | 12 | 20½ | 2 | 19½ | 15 | 1/16 | 63¾ |



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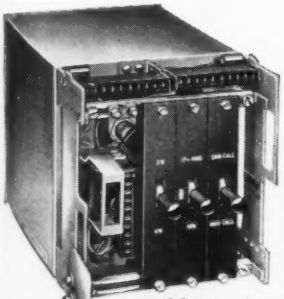
G.E.C.

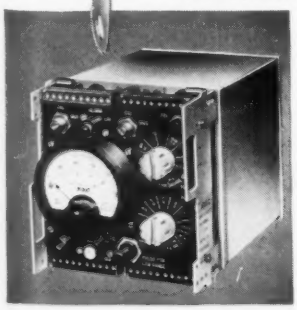
# 3 CIRCUIT AND 12 CIRCUIT OPEN-WIRE CARRIER Telephone Equipment

**The equipment is suitable for operation under varied climatic conditions. For example, a G.E.C. 12-circuit system is operating successfully near the Arctic Circle where severe icing conditions are experienced during the winter months.**



*Monitor Panel*

*Alarm Panel*



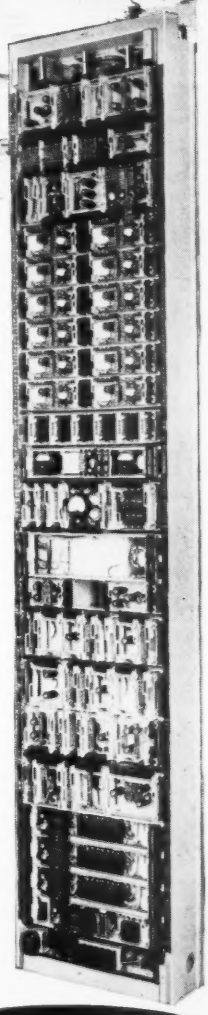
G.E.C. 3-circuit and 12-circuit carrier telephone equipment provides for the transmission of three and twelve high-quality speech circuits, respectively, over an open-wire route. Each speech circuit effectively transmits the frequency band 300 c/s to 3400 c/s. Signalling is effected at the out-of-band frequency of 3825 c/s on each circuit.

The signals transmitted to line in the 12-circuit system are within the frequency band 36 to 143 kc/s, and in the 3-circuit system within 3.16 to 31.1 kc/s in accordance with the recommendation of C.C.I.T.T. Thus a 3-circuit and a 12-circuit system can operate over the same open-wire pair. Several systems can operate along the same route.

When required, a broadcast programme circuit of approximately 10 kc/s bandwidth can be inserted at the intermediate frequency of 84 to 96 kc/s, in place of three speech circuits in either system. In addition, twenty-four voice-frequency telegraph channels can be provided over any speech circuit.

By suitably spacing repeaters along the route, a system may be operated over distances of many hundreds of miles, the exact distance and spacing of repeaters depending on local conditions.

The equipment itself is the latest G.E.C. Type 56. A complete 3-circuit terminal or a complete 12-circuit terminal is accommodated on one single-sided rack.



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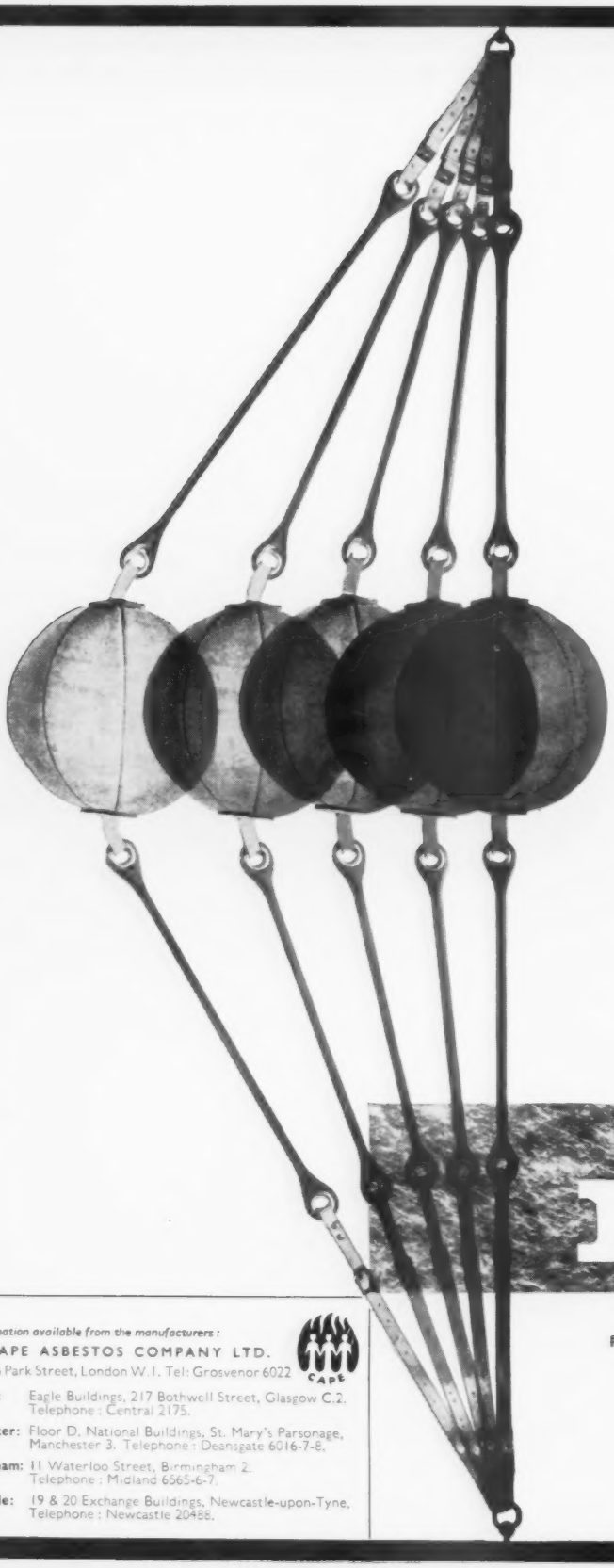

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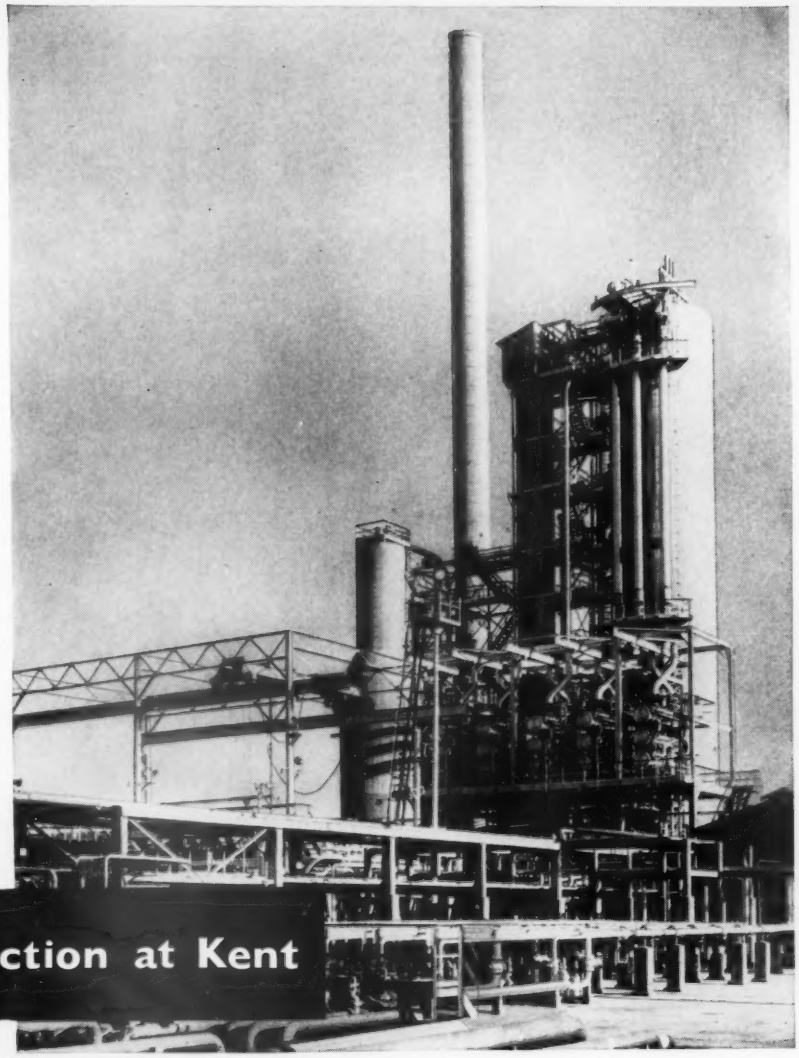
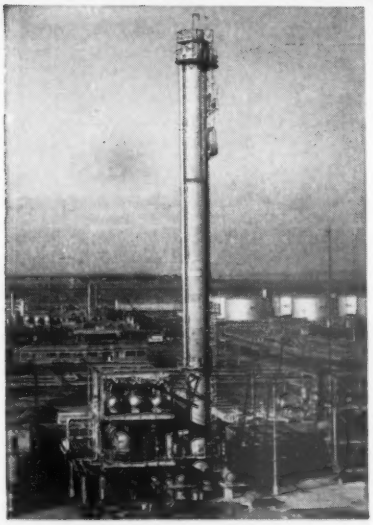


## Construction at Kent



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